IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HARBOR FREIGHT TOOLS USA, INC.,

GENERAC POWER SYSTEMS, INC., and

MWE INVESTMENTS, LLC,

Petitioners

v.

CHAMPION POWER EQUIPMENT, INC.,

Patent Owner.

Patent No. 11,492,985

Issued: Nov. 8, 2022

Title: OFF-BOARD FUEL REGULATOR FOR GENERATOR ENGINE

U.S. Patent No. 11,492,985

Inter Partes Review No. IPR2025-01272

PETITION FOR *INTER PARTES* REVIEW

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1002	File History for U.S. Patent No. 11,492,985 ("the '985 File History")
1003	Declaration of Dr. Timothy Morse
1004	DuroMax XP4400EH Operator's Manual ("DuroMax")
1005	U.S. Patent No. 5,718,265 to Elsdon ("Elsdon")
1006	U.S. Patent No. 4,492,207 to Hallberg ("Hallberg")
1007	Tri-Fuel YouTube Video (https://www.youtube.com/watch?v=DpknaAPTQ9U) ("Tri-Fuel Video")
1008	Indian Patent No. 207333 ("Chaudhari") (certified)
1009	*American Heritage Dictionary of the English Language* (3d ed. 1996) (excerpted)
1010	U.S. Patent Publication No. 2011/0100335 ("Parlatore")
1011	Champion's Claim Construction Brief in 23-cv-2371-PHX-DWL
1012	Declaration of Mr. David Raskin
1013	https://www.youtube.com/watch?v=Ip7ckWAZ3xQ
1014	Declaration of Mr. John Ley re Tri-Fuel Video
1015	Declaration of Mr. Jared Bennett re Tri-Fuel Video

Exhibit No.	Description
1016	2-Stage Regulator Assembly ("2-Stage Assembly") with WayBack Machine certification
1017	LP-Gas Code Handbook, Eighth Edition, Lemoff, Theodore C., (2008) (excerpted) ("LP-Gas Handbook")
1018	Champion's Infringement Contentions with Respect to Petitioner Harbor Freight's Model 70143 Generator
1019	Application Details for Indian Patent No. 207333 (Chaudhari)
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CLAIM LISTING

Element	Claim Language
[1.0]	A generator and fuel delivery system comprising:
[1.1]	a generator free of any pressure regulator and configured to operate on a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line;
[1.2]	a fuel regulator system located off-board the generator and comprising a first stage and a second stage, the fuel regulator system configured to:
[1.3]	regulate the gaseous fuel supplied from the pressurized fuel source in the first stage, the gaseous fuel regulated down to a reduced pressure in the first stage; and
[1.4]	regulate the reduced pressure gaseous fuel in the second stage, the reduced pressure gaseous fuel from the first stage regulated down to a desired pressure in the second stage for delivery through the gaseous fuel line to operate the generator.
2	The generator and fuel delivery system of claim 1 wherein the first and second stages comprise a dual stage regulator configured to regulate the gaseous fuel supplied from the pressurized fuel source and regulate the reduced pressure gaseous fuel.
3	The generator and fuel delivery system of claim 2 wherein the dual stage regulator is mounted directly onto the pressurized fuel source, off-board from the generator.
4	The generator and fuel delivery system of claim 1 wherein the generator comprises a dual fuel generator configured to operate on the gaseous fuel and on a liquid fuel, the liquid fuel supplied from a liquid fuel source through a liquid fuel line.

Element	Claim Language
5	The generator and fuel delivery system of claim 4 further comprising a mechanical fuel valve actuatable between a first position and a second position to selectively control fuel flow to the dual fuel generator from the liquid fuel source through the liquid fuel line and the pressurized fuel source through the gaseous fuel line.
[6.1]	The generator and fuel delivery system of claim 5 further comprising a fuel lockout apparatus coupled to the mechanical fuel valve;
[6.2]	wherein, when the mechanical fuel valve is in the first position, the fuel lockout apparatus communicates the liquid fuel source to the dual fuel generator and prevents the pressurized fuel source from coupling to the dual fuel generator; and wherein, when the mechanical fuel valve is in the second position, the fuel lockout apparatus permits the pressurized fuel source to couple to the dual fuel generator and interrupts the liquid fuel source communication with the dual fuel generator.
[7.1]	The generator and fuel delivery system of claim 1, wherein the first stage comprises a primary pressure regulator and the second stage comprises a secondary pressure regulator; and
[7.2]	wherein the generator and fuel delivery system further comprises a quick-connect hose coupling including: a first end coupled to an outlet of the secondary pressure regulator; and a second end coupled to an inlet of the gaseous fuel line to couple the secondary pressure regulator to the gaseous fuel line.

Element	Claim Language
8	The generator and fuel delivery system of claim 7, further comprising a regulator mounting device secured to the pressurized fuel source with at least the secondary pressure regulator mounted on the regulator mounting device.
9	The generator and fuel delivery system of claim 8, wherein the primary pressure regulator is mounted on the regulator mounting device.
[10.1]	The generator and fuel delivery system of claim 9, wherein the pressurized fuel source comprises a pressurized fuel container having a collar; and
[10.2]	wherein the regulator mounting device secures to the collar so that the primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar.
[11.0]	A generator and fuel delivery system comprising:
[11.1]	a generator comprising an engine configured to operate on a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line;
[11.2]	a fuel regulator system located off-board the generator and comprising a first stage and a second stage, the fuel regulator system configured to:
[11.3]	regulate the gaseous fuel supplied from the pressurized fuel source in the first stage, the gaseous fuel regulated down to a first reduced pressure in the first stage; and
[11.4]	regulate the gaseous fuel output from the first stage in the second stage, the first reduced pressure gaseous fuel from the first stage being regulated down to a second reduced pressure in the second stage for delivery through the gaseous fuel line to operate the generator;

Element	Claim Language
[11.5]	wherein the fuel regulator system outputs gaseous fuel to the generator for operation of the engine at the second reduced pressure.
12	The generator and fuel delivery system of claim 11 wherein the first and second stages comprise a dual stage regulator configured to regulate the gaseous fuel supplied from the pressurized fuel source and regulate the reduced pressure gaseous fuel.
13	The generator and fuel delivery system of claim 12 wherein the dual stage regulator is mounted directly onto the pressurized fuel source, off-board from the generator.
14	The generator and fuel delivery system of claim 11 wherein the generator comprises a dual fuel generator configured to operate on the gaseous fuel and on a liquid fuel, the liquid fuel supplied from a liquid fuel source through a liquid fuel line.
15	The generator and fuel delivery system of claim 14 further comprising a mechanical fuel valve actuatable between a first position and a second position to selectively control fuel flow to the dual fuel generator from the liquid fuel source through the liquid fuel line and the pressurized fuel source through the gaseous fuel line.
[16.0]	A dual fuel generator and fuel delivery system comprising:
[16.1]	a dual fuel generator configured to operate on a liquid fuel supplied from a liquid fuel source through a liquid fuel line and a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line;
[16.2]	a fuel regulator system located off board the dual fuel generator, the fuel regulator system comprising:

Element	Claim Language
[16.3]	a primary pressure regulator coupled to a service valve of the pressurized fuel source and configured to regulate the fuel supplied from the pressurized fuel source to a first reduced pressure; and
[16.4]	a secondary pressure regulator coupled to the primary pressure regulator and configured to regulate the gaseous fuel supplied from the primary pressure regulator down from the first reduced pressure to a second reduced pressure for delivery through the gaseous fuel line to operate the dual fuel generator;
[16.5]	wherein the fuel regulator system outputs gaseous fuel to the dual fuel generator for operation thereof at the second reduced pressure.
17	The dual fuel generator and fuel delivery system of claim 16 wherein the primary and secondary pressure regulators are integral components of a dual stage pressure regulator.
18	The dual fuel generator and fuel delivery system of claim 16, further comprising a quick-connect hose coupling including: a first end coupled to an outlet of the secondary pressure regulator; and a second end coupled to an inlet of the gaseous fuel line to couple the secondary pressure regulator to the gaseous fuel line.
19	The dual fuel generator and fuel delivery system of claim 16, wherein the pressurized fuel source comprises a pressurized fuel container having a collar; and wherein a regulator mounting device secures to the collar so that the primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar.

Harbor Freight Tools USA, Inc. ("Harbor Freight"), Generac Power Systems, Inc., and MWE Investments, LLC, ("Petitioners") petition for *Inter Partes* Review ("IPR") under 35 U.S.C. §§311-319 and 37 C.F.R. §42 of Claims 1-19 ("the Challenged Claims") of U.S. Patent No. 11,492,985 ("the '985 Patent"). This Petition establishes a reasonable likelihood that Petitioners will prevail in showing at least one of the Challenged Claims is unpatentable. Petitioners respectfully request that this IPR be instituted, and that the Challenged Claims be canceled as unpatentable.

I. STANDING AND RELIEF REQUESTED

Petitioners certify that the '985 Patent is available for IPR. Petitioners are not barred or estopped from requesting this review, and request IPR of the Challenged Claims on the grounds set forth below.

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)
1	**1-3, 11-13**	102/103	Parlatore
2	**7-10**	103	Parlatore in view of LP-Gas Handbook
3	**1, 4, 7, 11, 14, 16, 18**	102	Tri-Fuel Video
4	**2-3, 8-10, 12-13, 17, 19**	103	Tri-Fuel Video in view of Parlatore and LP-Gas Handbook
5	**1, 4, 11, 14, 16**	102	Chaudhari

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)
6	**4, 14, 16-19**	103	Parlatore in view of Chaudhari and LP-Gas Handbook
7	**4-6, 14-15**	103	Parlatore in view of DuroMax and Elsdon
8	**4-6, 14-15**	103	Parlatore in view of Hallberg

This Petition explains how the claims are unpatentable under the statutory grounds identified, identifying where each element can be found in the cited prior art and how the prior art renders the Challenged Claims unpatentable. The Petition is further supported by the declaration of Dr. Timothy Morse, an expert in the field of dual-fuel engines and fuel delivery systems. EX1003, ¶¶1-14.

II. STATE OF THE ART

A. Multi-Fuel Generators

The ’985 Patent teaches that multi-fuel generators were known in the art at the time of the invention:

> Certain generators are configured to operate as “dual fuel” generators, otherwise known as bi-fuel generators. These generators are driven by an internal combustion engine that is configured to operate on a liquid fuel for a period of operation and an alternative fuel for another period of operation.

EX1001, 1:40-45.

Multi-fuel generators have been known in the art since at least 1999. *See generally* EX1008 (describing an engine, preferably coupled to a generator, configured to operate on gasoline or kerosene and LPG). Below is an image of a DuroMax dual-fuel generator that was on sale since at least 2012:



EX1004, 1; EX1012, ¶¶3-4, 17-20.

B. Dual-Stage Regulators

A pressure regulator is designed to control vapor pressure. EX1017, 118-119 (§5.8.1: "Propane appliances in buildings typically operate at 11 in. w.c. (2.7 kPa) (about 1/2 psi), so the vapor pressure of the propane in the container must be reduced to a much lower pressure for the appliance to operate safely."). EX1003,

¶38. The same is true for outdoor appliances, such as portable generators and BBQ grills. *Id.* These appliances rely on a propane tank for fuel where propane is stored as a liquid under a pressure of approximately 100 psi that must be reduced to a much lower pressure to operate properly. *Id.*

As noted in the LP-Gas Handbook, the LP-Gas Code has definitions for the various types of regulators, including the first-stage regulators, second-stage regulators, and integral two-stage regulators referenced in the ’985 Patent:

3.3.64.2 First-Stage Regulator. A pressure regulator for LP-Gas vapor service designed to reduce pressure from the container to 10.0 psig (69 kPag) or less.

3.3.64.3 High-Pressure Regulator. A pressure regulator for LP-Gas liquid or vapor service designed to reduce pressure from the container to a lower pressure in excess of 1.0 psig (6.9 kPag).

3.3.64.4 Integral 2 psi Service Regulator. A pressure regulator for LP-Gas vapor service that combines a high-pressure regulator and a 2 psi service regulator into a single unit.

3.3.64.5 Integral Two-Stage Regulator. A pressure regulator for LP-Gas vapor service that combines a high-pressure regulator and a second-stage regulator into a single unit.

3.3.64.6 Line Pressure Regulator. A pressure regulator in accordance with the *Standard for Line Pressure Regulators*, ANSI Z-21.80/CSA 6.22, with no integral overpressure protection device for LP-Gas vapor service designed for installation inside a building to reduce a nominal 2 psig inlet pressure to 14 in. w.c. (4.0 kPa) or less.

3.3.64.7 Second-Stage Regulator. A pressure regulator for LP-Gas vapor service designed to reduce first-stage regulator outlet pressure to 14 in. w.c. (4.0 kPag) or less.

3.3.64.8 Single-Stage Regulator. A pressure regulator for LP-Gas vapor service designed to reduce pressure from the container to 1.0 psig (6.9 kPag) or less.

3.3.64.9 2 psi Regulator System. An LP-Gas vapor delivery system that combines a first-stage regulator, a 2 psi (14 kPag) service regulator, and a line pressure regulator(s).

3.3.64.10 2 psi Service Regulator. A pressure regulator for LP-Gas vapor service designed to reduce first-stage regulator outlet pressure to a nominal 2 psig (14 kPag).

3.3.64.11 Two-Stage Regulator System. An LP-Gas vapor delivery system that combines a first-stage regulator and a second-stage regulator(s), or utilizes a separate integral two-stage regulator.

EX1017, 40-41 (§3.3.64) (annotated).

As described in the LP-Gas Handbook, since 1995,

> two-stage pressure regulation systems have been required for most fixed propane installations in buildings. The regulators used in two-stage regulator systems are designed to reduce propane container pressure to an intermediate pressure of 10 psig (69 kPag), and then

> further reduce pressure to 11 in. w.c. (2.7 kPag). This is accomplished with the use of two separate regulators (first- and second-stage), or with one single unit, an integral two-stage regulator.

EX1017, 118-119 (commentary regarding §5.8.1).

Although not strictly required for use outdoors, such as with generators and outdoor BBQ grills, using a two-stage pressure regulation system is advantageous because of its ability to maintain a constant outlet pressure, particularly as the inlet fuel pressure varies. EX1003, ¶41.

As the LP-Gas Handbook indicates, dual-stage regulators were well-known at the time of the invention. *Id*., ¶42. For example, off-the-self dual-stage regulators were generally available at least by 2008, as shown below:



EXHIBIT 3.12 *Integral Two-Stage Regulator. (Courtesy of Engineered Controls International, Inc.)*

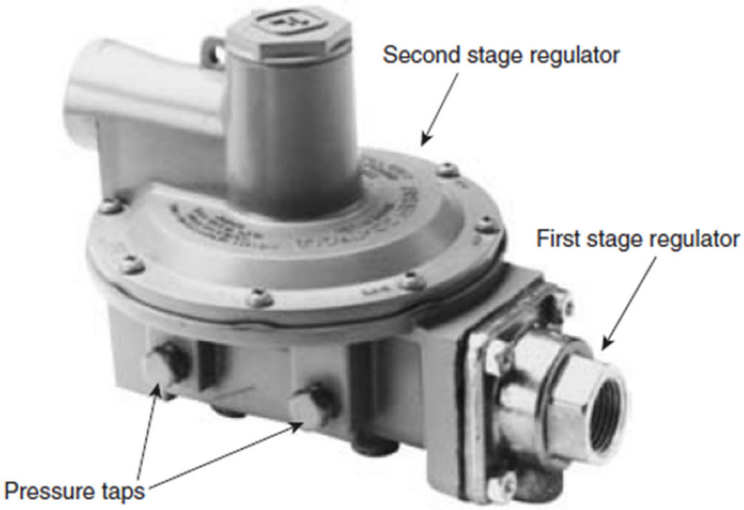


EXHIBIT 5.47 *Integral Two-Stage Regulator. (Courtesy of Fisher Controls Intl, LLC)*

EX1017, 41, 120 (published in 2008).



2-Stage Low Pressure Regulator Assembly

$70.00 SKU: 106238

Add to Cart

Used for connecting commercial grade BBQ & Catering Grills requiring gas input in excess of 100,000 BTU's per hour to a propane tank via high volume green Type 1 tank connection. The green Type 1 allows a higher volume of gas to pass through the tank connection before going into bypass mode. *Standard Hose Length is 18" OAL Learn More

Add to Wishlist | Add to Compare



2-Stage Low Pressure Regulator Assembly with Stainless Steel Overbraid

$90.00 SKU: 106221

Add to Cart

Stainless Steel Overbraided Two-Stage Regulator Assembly used for connecting commercial grade BBQ & Catering Grills requiring gas input in excess of 100,000 BTU's per hour to a propane tank via high volume green Type 1 tank connection. The green Type 1 allows a higher volume of gas to pass through the tank connection before going into bypass mode. The overbraid keeps small animals from damaging the hose. *Standard Hose Length is 18" OAL Learn More

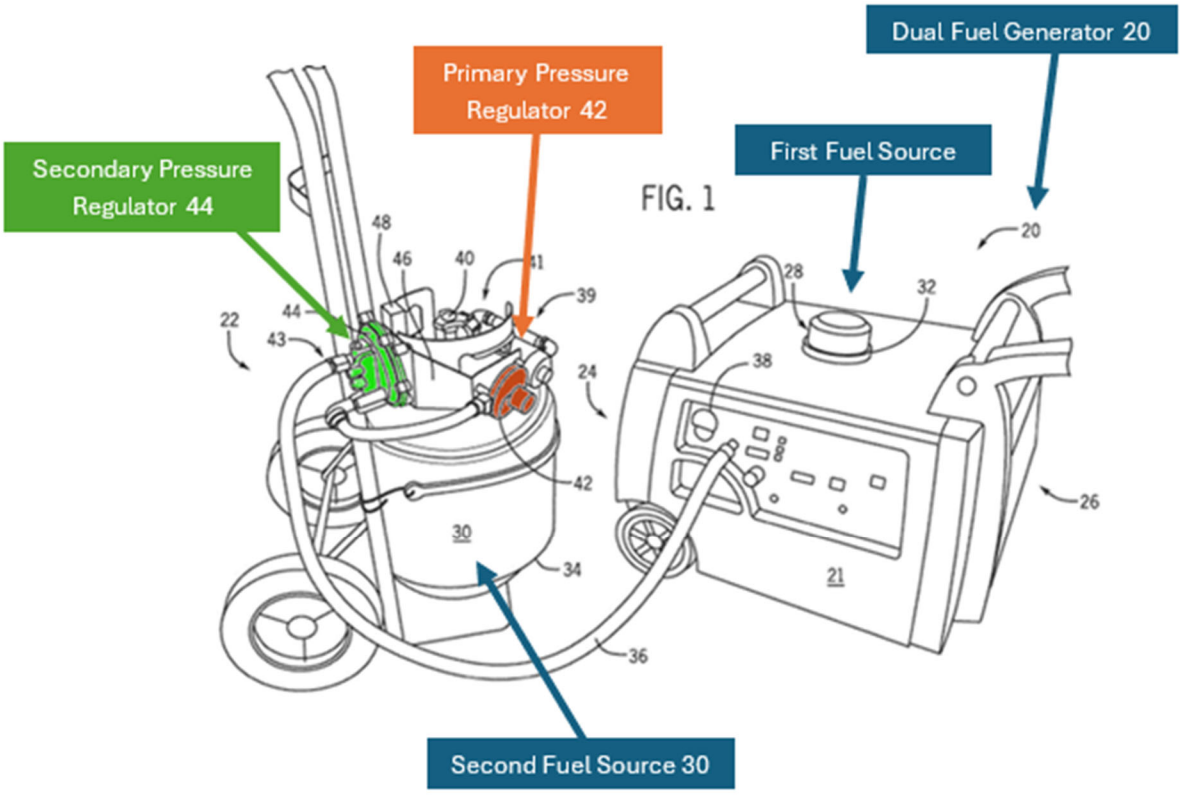
Add to Wishlist | Add to Compare

EX1016 (webpage from 2013).

III. SUMMARY OF THE ’985 PATENT

A. The ’985 Patent

The ’985 Patent is directed to supplying gaseous fuel to engines, including multi-fuel internal combustion engines and generators. EX1001, Abstract, 1:21–55. The ’985 Patent acknowledges that multi-fuel combustion engines typically run on liquid fuel (e.g., gasoline) and an alternative gaseous fuel (e.g., propane). *Id*., 1:21–39. Figure 1 of the ’985 Patent discloses a perspective view of a generator with such an engine, as shown below:



The ’985 Patent teaches using two pressure regulators in the gaseous fuel line—a primary regulator coupled to the gaseous fuel source, and a downstream regulator to further regulate the pressure of the gaseous fuel as it enters the engine. *Id*., 4:31–49. The ’985 Patent further recognizes that the secondary regulator may be located on the generator or “off-board the generator to reduce size and cost of the generator.” *Id*., 4:50–59.

B. Prosecution History

The ’985 Patent family includes at least 13 U.S. patents and/or pending applications.[1] The ’985 Patent issued from U.S. Application No. 16/783,455, which was filed on February 6, 2020, and claims priority to two applications, the earliest of which is U.S. Application No. 14/738,060, which was filed on June 12, 2015.

The ’985 Patent’s prosecution history includes multiple rejections and amendments. The Examiner primarily relied on a YouTube video (“Bassguitarist1985”), “Yamaha EF2000iS Tri-Fuel Conversion: Overview & Installation Tips,” https://www.youtube.com/watch?=caZawwDaRQg, and U.S. Pub. No. 2011/0168133 (“Pursifull”) in the rejections. EX1002, 58-63, 103-108.

[1] Family members include U.S. Patent App. Nos. 15/285,215; 14/738,060; 14/925,441; 15/332,264; 16/946,438; 15/285,215; 16/358,822; 16/946,439; 17/937,046; 18/183,734; 18/443,487; and 19/026,996.

The Examiner asserted that, *inter alia*, Bassguitarist1985 disclosed off-board dual regulators, which the applicant contested on appeal (*id*., 184-185). The PTAB reversed the Examiner, finding the term "off-board" meant located remotely from the engine. *Id*., 237-239.

IV. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (hereinafter "POSA") would "be aware of all the pertinent prior art" at the time of the alleged invention (*Custom Accessories, Inc. v. Jeffrey-Allan Indus*., 807 F.2d 955, 963 (Fed. Cir. 1986)), including specialized knowledge applicable to various aspects of the claimed invention. *See, e.g*., *AVX Corp. v. Greatbatch, Ltd*., IPR2014-00697, Paper 60 at 3 (P.T.A.B. Jan. 11, 2016). A POSA is also a person of ordinary creativity, not an automaton, and thus is able to make inferences from the art. *KSR Int'l Co. v. Teleflex*, 550 U.S. 398, 420-21 (2007).

For purposes of this IPR, a POSA would have a degree in mechanical engineering, physics, materials science, or related fields, and three years of work experience in combustion engines. EX1003, ¶34. Additional higher graduate education could substitute for work experience, and additional work experience/training could substitute for formal education. *Id*.

V. CLAIM CONSTRUCTION

The Board construes claims under the standard set forth in *Phillips v. AWH Corp*., 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. §42.100(b). Under this standard, claim terms should be given their plain and ordinary meaning as understood by a person of ordinary skill in the art and the prosecution history.

Petitioners propose the following claim constructions for certain claim terms. Petitioner has not identified any other claim terms that need construction in order to address the issues raised by this petition, but Petitioner reserves the right to respond to any constructions offered by Patent Owner or the Board.

A. The "Fuel Lockout Apparatus" of Claim 6

Claim 6 of the '985 Patent requires "a fuel lockout apparatus." As explained below, the term "fuel lockout apparatus" is a means-plus-function claim term that covers the following corresponding structure and equivalents thereof: Items 58, 61 in Figs. 2, 3, 4A, 4B, as described at EX1001, 5:50-6:11; 6:24-45; 6:56-7:31; 8:1-14; 8:63-9:11.[2]

[2] If this term is not treated as a means-plus-function limitation, it should be given the meaning that patentee chose for it, as clearly supported by the sole embodiment in the specification and discussed below—"a moveable barrier capable of blocking physical access for attaching a fuel source to a fuel inlet on the second fuel line."

1. "Fuel Lockout Apparatus" Invokes §112(f)

The term "fuel lockout apparatus" does not provide any structure corresponding to the function of providing fuel lockout, thus invoking 35 U.S.C. §112(f).

Section 112(f) applies to claim terms that recite "function without reciting sufficient structure for performing that function." *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1349 (Fed. Cir. 2015). A "critical question" in making this assessment "is whether the claim term is used in common parlance or by persons of skill in the pertinent art to designate structure." *MTD Prods. Inc. v. Iancu*, 933 F.3d 1336, 1341 (Fed. Cir. 2019) (internal citations omitted). Generic terms such as "mechanism," "element," "device," and other nonce words … [are] tantamount to using the word "means" because they "typically do not connote sufficiently definite structure" and therefore invoke §112(f). *Williamson*, 792 F.3d at 1350. "Apparatus" is another example of a generic term that often invokes §112(f). M.P.E.P. §2181 ("apparatus" is a "non-structural generic placeholders that may invoke 35 U.S.C. 112(f)").

The phrase "fuel lockout apparatus" is not understood by POSAs to connote a specific structure. EX1003, ¶54. The claim merely replaces the term "means" with "apparatus." *Id.* The term "fuel lockout apparatus" has no independent meaning aside from "a means for providing fuel lockout." *Id.* The claim language

fails to provide any structure for the "providing fuel lockout" function and is therefore subject to construction under §112(f).

2. The Corresponding Structure for "Fuel Lockout Apparatus"

The '985 Patent describes a single embodiment of a "fuel lockout apparatus." In that embodiment, the "fuel lockout apparatus 58" is a "flange" that "is rigidly coupled to the rotating handle [56]." EX1001, 6:33-45. The flange "extends radially outward from fuel valve handle 56" and "sweeps over" the LPG fuel hose coupling "as the fuel valve handle rotates." *Id.* The flange "blocks off" or "uncovers" the "first end 50a of the quick-disconnect hose coupling when fuel valve handle 56 is rotated" between the first and second positions. *Id.*, 7:22-25.

When the fuel lockout apparatus is in the first position (selecting gasoline), the flange provides a barrier that extends over the LPG supply hose coupling 50a, preventing the user from coupling a LPG supply hose (locking out LPG):

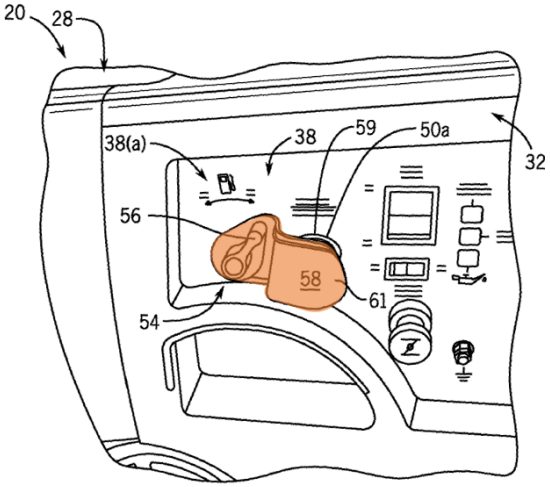


FIG. 2

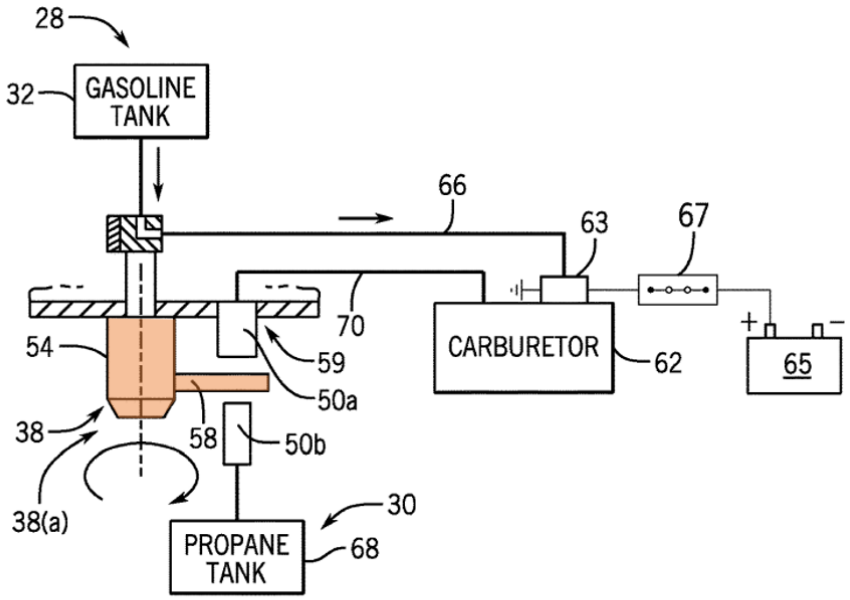


FIG. 4A

EX1001, Figs. 2, 4A (annotated), 7:18-31.

When in the second position (selecting LPG), the fuel lockout apparatus prevents the user from selecting gasoline until the LPG supply hose is removed (locking out gasoline):

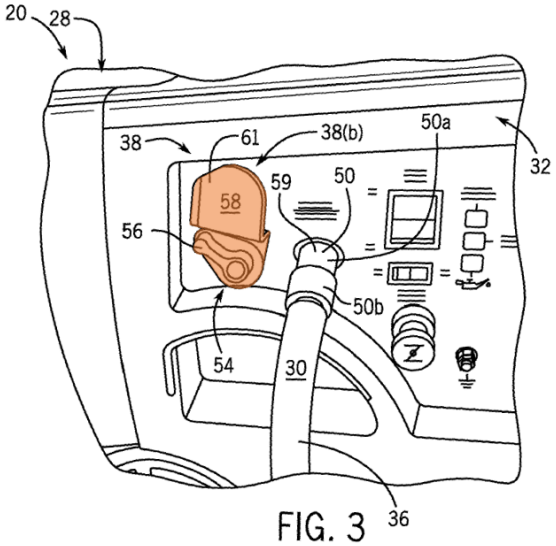


FIG. 3

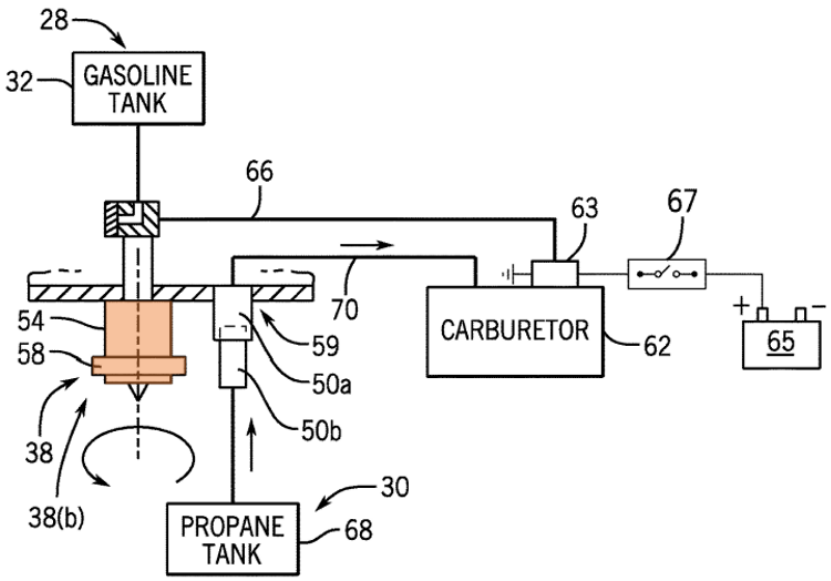


FIG. 4B

EX1001, Figs. 3, 4B (annotated), 7:32-43.

The flange (61) provides both the gasoline and LPG lockout functionality. Thus, the proper structure corresponding to the "providing fuel lockout" functionality is items: 58 and 61 in Figures 2-3 and 4A-4B, as described in the specification at 5:50-6:10; 6:24-45; 6:56-7:31; 8:1-14; 8:63-9:11.

B. The Terms "Prevent…Coupling" and "Permit…to Couple"

Claim 6 of the '985 Patent recites:

> when the mechanical fuel valve is in the first position, the fuel lockout apparatus…***prevents*** the pressurized fuel source from ***coupling*** to the dual fuel generator;
>
> and wherein, when the mechanical fuel valve is in the second position, the fuel lockout apparatus ***permits*** the

> pressurized fuel source ***to couple*** to the dual fuel generator….

(Emphasis added).

The terms "coupling" and "to couple" refer to physically connecting or attaching two items. EX1009, 4; EX1003, ¶60.

The '985 Patent specification discloses only one way the fuel lockout apparatus "prevent[s]…coupling": the "flange" (61) "block[s] fuel inlet 59 to prevent coupling the first end 50a and second end 50b of the quick-disconnect hose coupling together." EX1001, 8:9-11; *see also* EX1001, 5:65-6:10, 6:24-45, Figs. 2, 4A.

The '985 Patent specification also discloses only one way the fuel lockout apparatus "permits" the pressurized fuel source "to couple" to the pressurized fuel line: "fuel lockout apparatus 58 unblock[s] fuel inlet 59 to permit attaching first end 50a and second end 50b together." EX1001, 8:12-14; Figs. 3, 4B; *see also id.*, 6:46-55, 8:52-62, Figs. 3, 4B.

Therefore, a POSA would have understood the terms "prevent…coupling" and "permit…to couple" to mean "prevent…attaching" and "permit…to attach," respectively. EX1003, ¶¶61-63.

Indeed, the Examiner of related Patent No. 10,221,780 interpreted the term "coupling" to require not only fluid communication, but physical connection.

EX1020, 79 (Examiner: "fuel lockout apparatus prevent[s] the second fuel source from coupling to the second fuel line…mean[ing] that not only are the two not in fluid communication but they are not ***physically connected*** in any manner" (emphasis added); *id.* (Champion prior art manual "discloses a dual fuel system as discussed…but its lockout switch does not prevent the hose of the propane tank from even ***coupling to the engine fuel system lines***") (emphasis added).

C. Patent Owner's Proposed Constructions Are Incorrect

In the Related Matters (*see infra* §VIII.B), Patent Owner appears to adopt a claim construction wherein (1) the "fuel lockout apparatus" can be any apparatus that prevents selection of more than one fuel source; (2) "prevent…coupling" can be any means to prevent fuel flow without necessarily preventing physical attachment of a fuel source to a fuel line; and (3) "permit…to couple" can be any means to permit fuel flow without necessarily permitting physical attachment of a fuel source to a fuel line. *See, e.g.,* EX1011, 17, 19; *see also* EX1003, ¶¶64-65.

Patent Owner's proposed constructions are wrong, as explained above. However, Petitioners include an alternative position for claim 6 in Ground 8, showing how claim 6 is obvious under Patent Owner's proposed constructions. In arguing in the alternative, Petitioners do not admit or concede that Patent Owner's apparent constructions are correct.

VI. OVERVIEW OF THE ASSERTED PRIOR ART

A. U.S. Patent Pub. No. 2011/0100335A1 ("Parlatore")

U.S. Patent Pub. No. 2011/0100335A1 ("Parlatore") published in 2011. EX1010. It is prior art under §102(a).

Parlatore is directed to a fuel delivery system that includes a propane tank, a first regulator coupled to the tank, and a second regulator connected to the first regulator, as depicted in Parlatore's Figures 1 and 3:

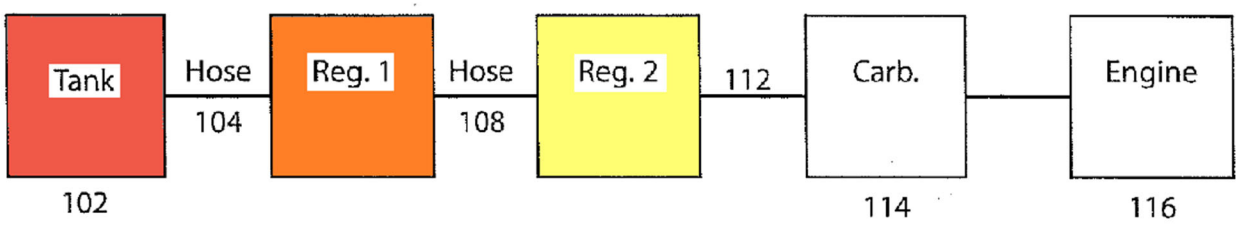


Fig. 1

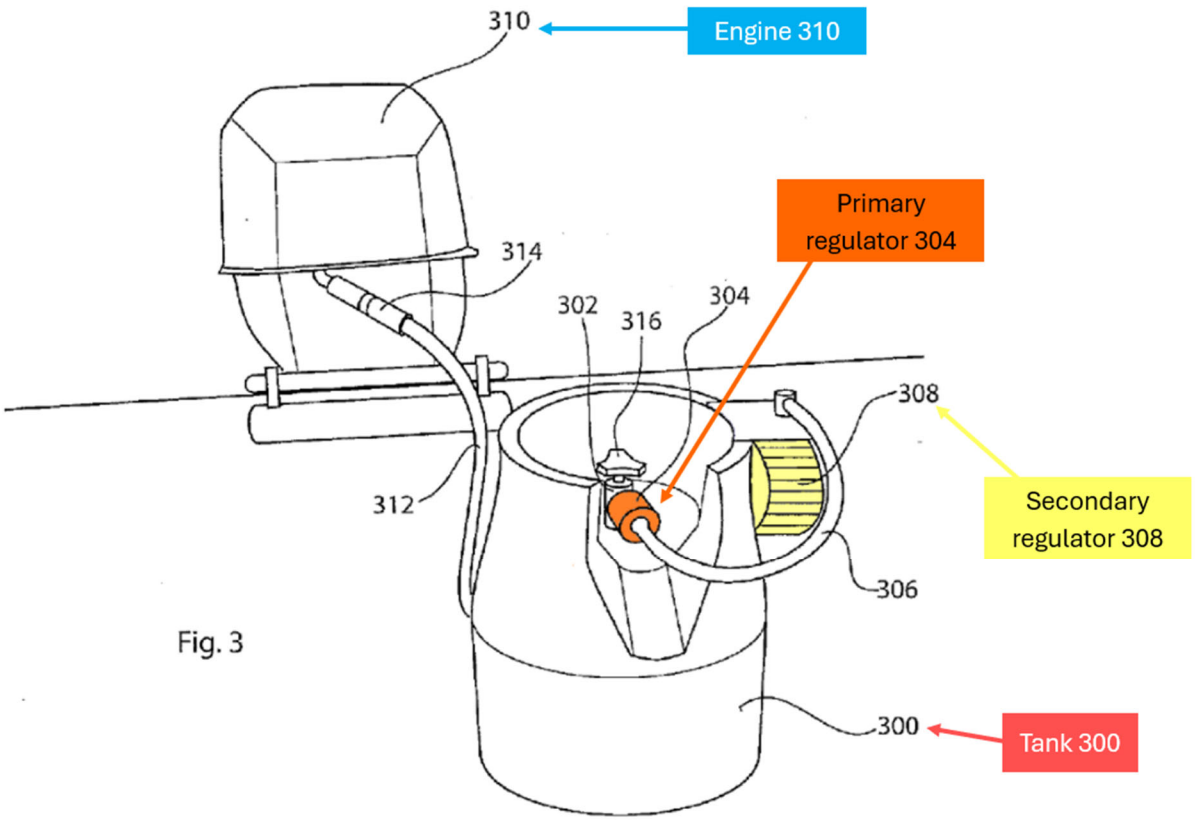


Fig. 3

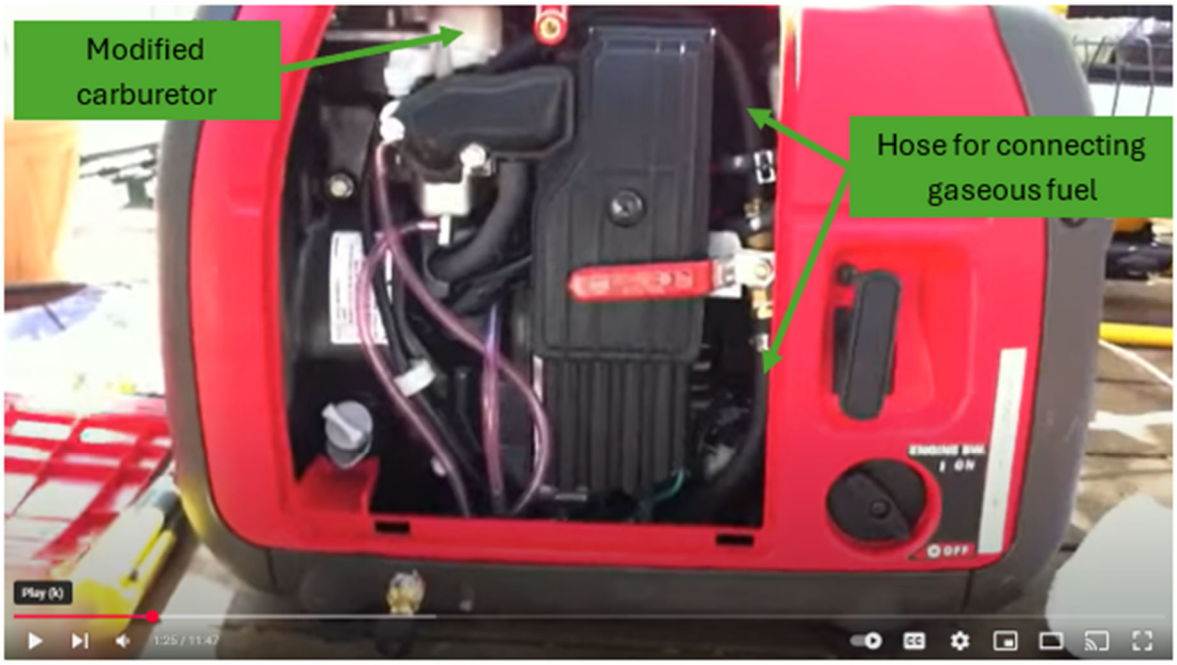
EX1010, ¶¶[0005]-[0006], Figs. 1, 3 (annotated).

Parlatore thus discloses the use of primary and secondary pressure regulators, positioned at/near the LPG tank and remote from the engine/generator, to regulate propane delivery to an engine/generator.

B. Tri-Fuel Video

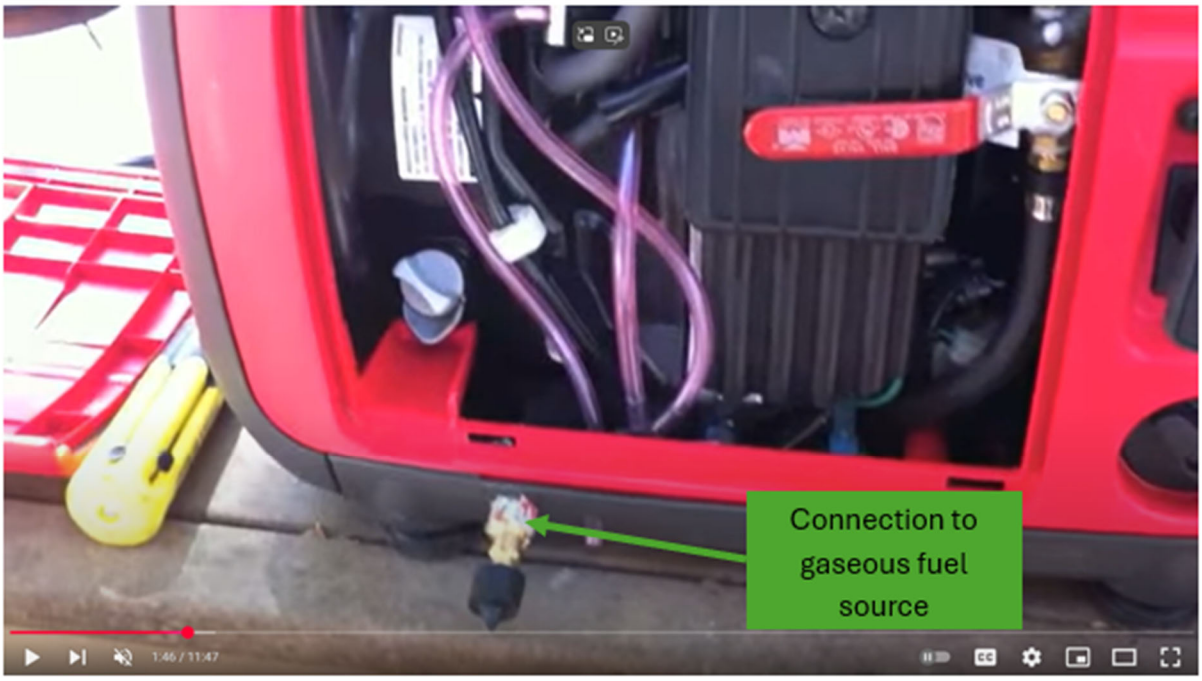
The Tri-Fuel Video (EX1007) is a YouTube video entitled "Honda Generator Tri-Fuel, EU2000i Triple-Fuel" that was posted by the profile "Mark 'Mark1Jordon1' Kash" on October 2, 2011, as well as viewed and commented on at least 13 years ago. EX1014-1015. It is prior art under §102(a).

The Tri-Fuel Video discloses a Honda generator modified to operate on multiple different fuels. The video shows a modified carburetor for use in the Honda generator so that propane or natural gas can be used to fuel the generator as alternatives to gasoline. The person in the video explains that a hole can be drilled in the carburetor and a hose attached to connect propane and/or natural gas fuel sources to alternatively power the generator. *Id.*, 0:36–2:00.[3]



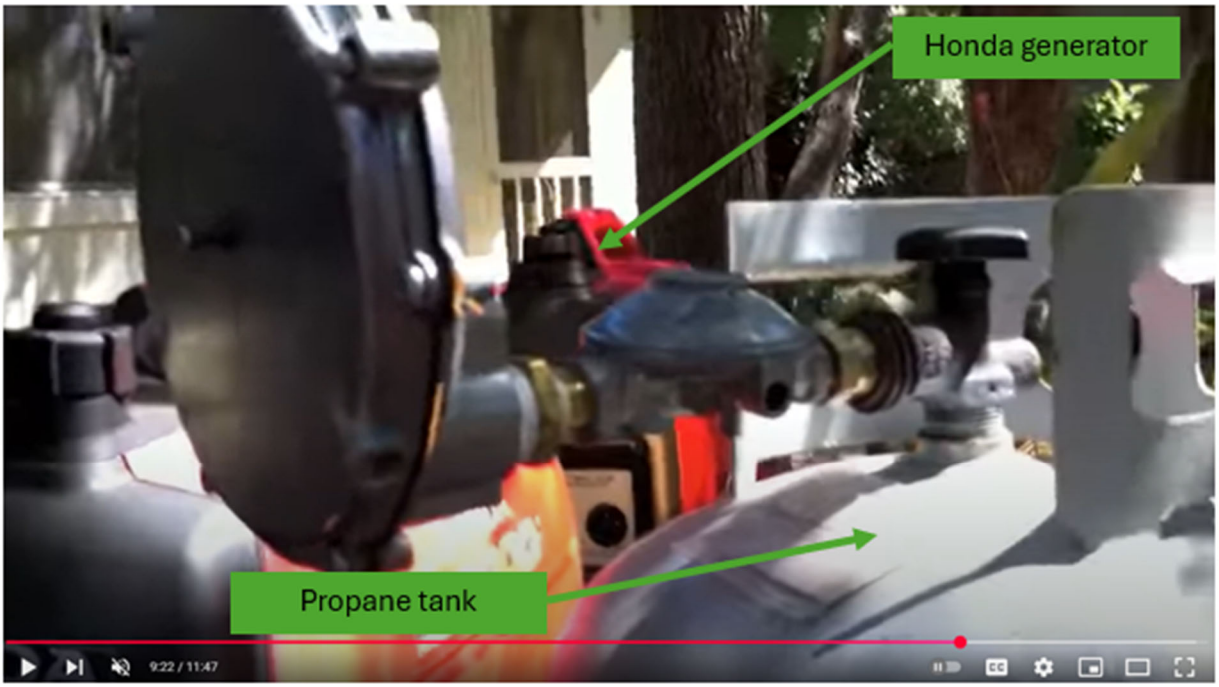
Id., 1:25 (annotated).

[3] Citations to the Tri-Fuel Video refer to the time stamp in the video.



Id., 1:46 (annotated).

The Tri-Fuel Video further shows that a propane tank and regulators are located remotely from the Honda generator, as shown in the screenshots below:



Id., 9:18.



Id., 1:58 (annotated).

The Tri-Fuel Video further explains that two regulators are attached to the propane tank (i.e., located remotely from the generator) to reduce the pressure of the propane in two stages. The first regulator changes "the high pressure of the gas

to about ½ psi" and the second regulator further reduces the pressure to -0.5 water column (meaning 0.5 inches of water column below atmospheric pressure). *Id.*, 2:00–3:26.



Id., 3:06.

The video then shows a user connecting the propane tank to the Honda generator through a hose.



Id., 3:38 (annotated).

Thus, the Tri-Fuel Video shows a generator that has been modified to operate on multiple fuel sources by attaching a separate propane tank to a generator, with primary and secondary pressure regulators located at and attached directly to the propane tank (i.e., "off-board" the generator) to manage the pressure of the propane gas delivered to the generator engine.

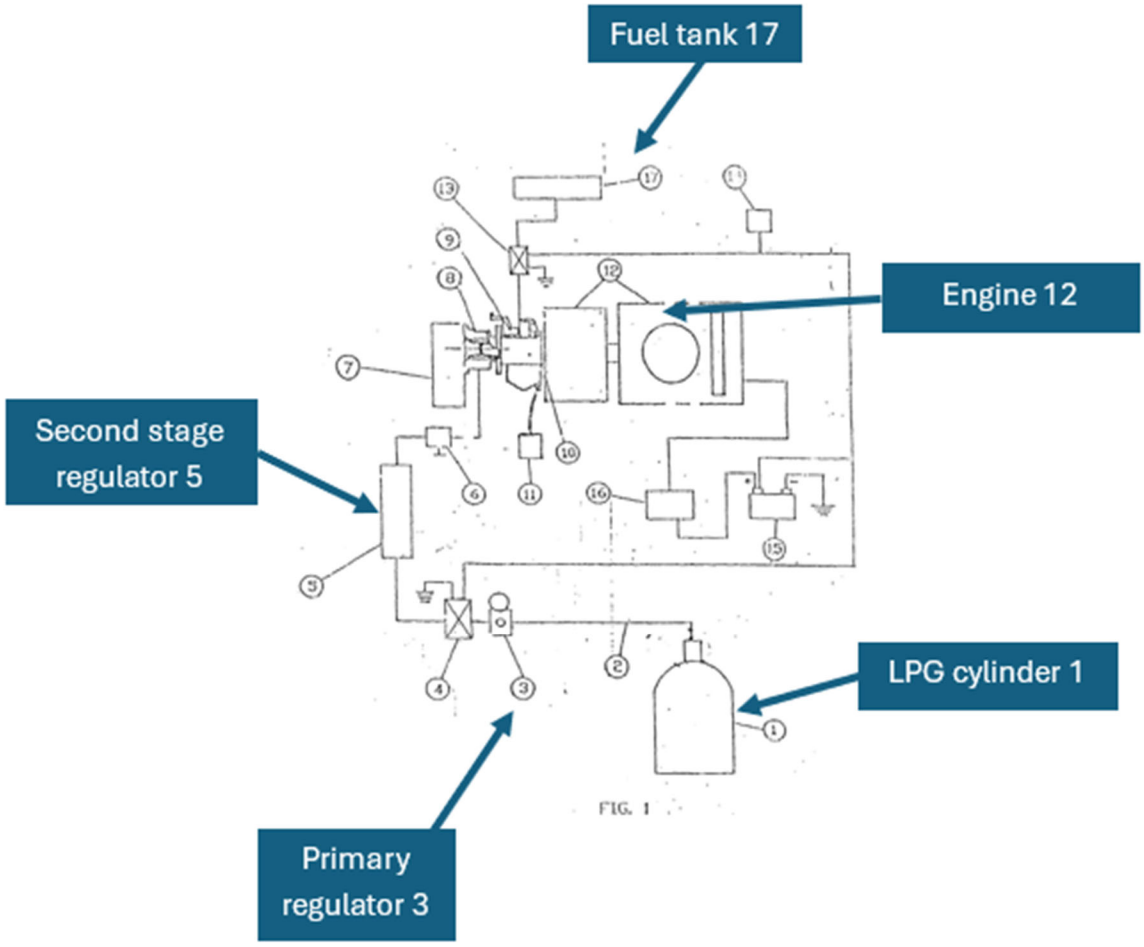
C. Indian Patent No. 207333 ("Chaudhari")

Chaudhari was filed in 1999, published in 2006, and issued in 2007. EX1008, 2; EX1019. Chaudhari is prior art under §102(a).

Chaudhari discloses "a system for supplying Liquified Petroleum Gas (LPG) to bi-fuel stationary engines in response to the load and speed of the engine, such

engines preferably being coupled to a portable generator." EX1008, 4. In the embodiment discussed, Chaudhari discloses a LPG delivery system connected to a generator that operates on gasoline or kerosene. *Id.*

The LPG delivery system includes a primary regulator 3 and a second stage regulator 5 to reduce the pressure of the LPG in two stages before delivery to the generator. *Id.*, 7.



Id., Fig. 1 (annotated).

The LPG delivery system and the regulators are "off-board" the generator because it is an improved "Add-On" system for existing engines and generators. *Id.*, 4-5.

D. DuroMax XP4400EH Operator's Manual ("DuroMax")

DuroMax was published/publicly available at least by November 1, 2012. EX1012, ¶¶18-19. DuroMax is prior art under §102(a).

DuroMax discloses the XP4400EH dual-fuel generator that runs alternatively on gasoline or LPG.

The generator includes a mechanical fuel shutoff valve having a valve handle.

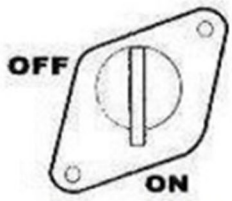


Figure 6 - fuel valve in the "on" position

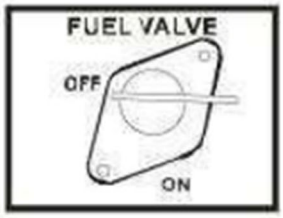


Figure A - Fuel Valve in the "OFF" position

EX1004, 11-12.

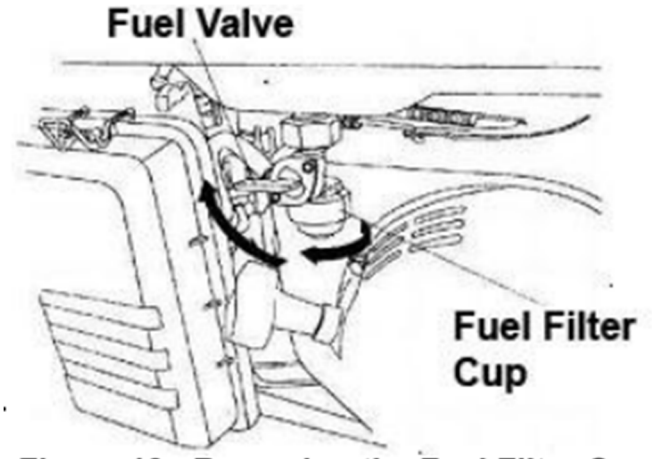
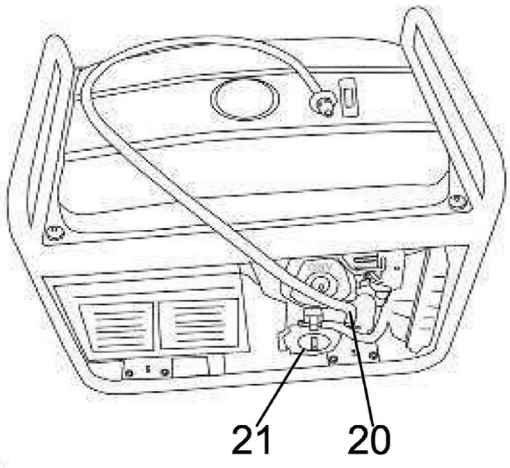


Figure 19 –Removing the Fuel Filter Cup

EX1004, 20.

The generator also includes a LPG fuel inlet.



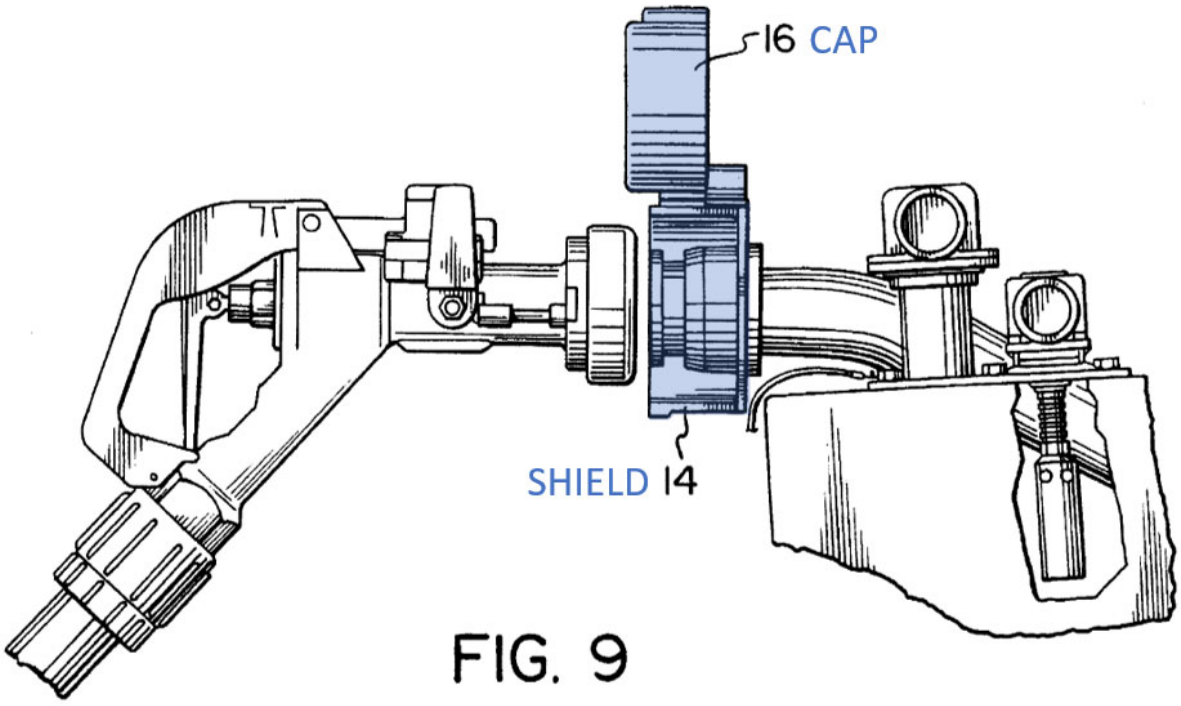
20. **Hose connector-** Connect liquid propane gas to generator.

EX1004, 7-8.

E. U.S. Patent No. 5,718,265 ("Elsdon")

Elsdon issued in 1998. EX1005. Elsdon is prior art under §102(a).

Elsdon discloses a fluid conduit coupler 12 assembly having cap 16 and shield 14 that is used for "flammable or other hazardous fluids, such as fuel…" EX1005, 1:10-13, 3:3-4, Fig. 9.



Id., Fig. 9 (annotated).

Cap 16 is connected to shield 14 and is readily moveable between an open position (Figures 1 and 9) and a closed position (Figure 2) in which cap 16 is positioned over the coupler 12 to prevent coupling with a fuel hose. *Id.*, 3:4-11.

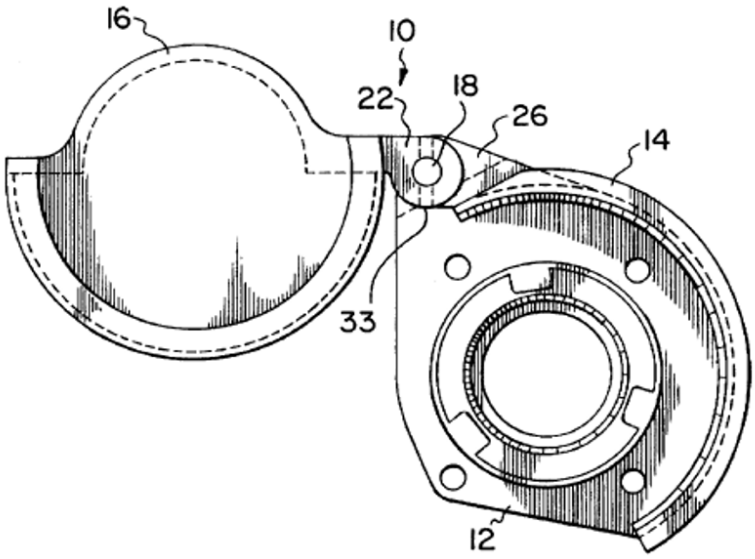


FIG. 1

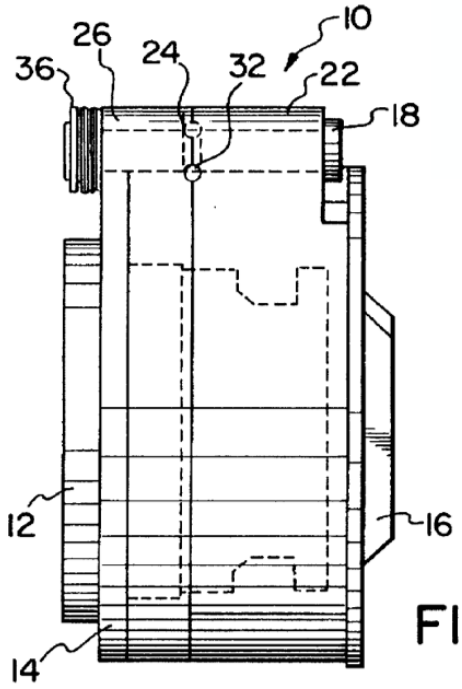


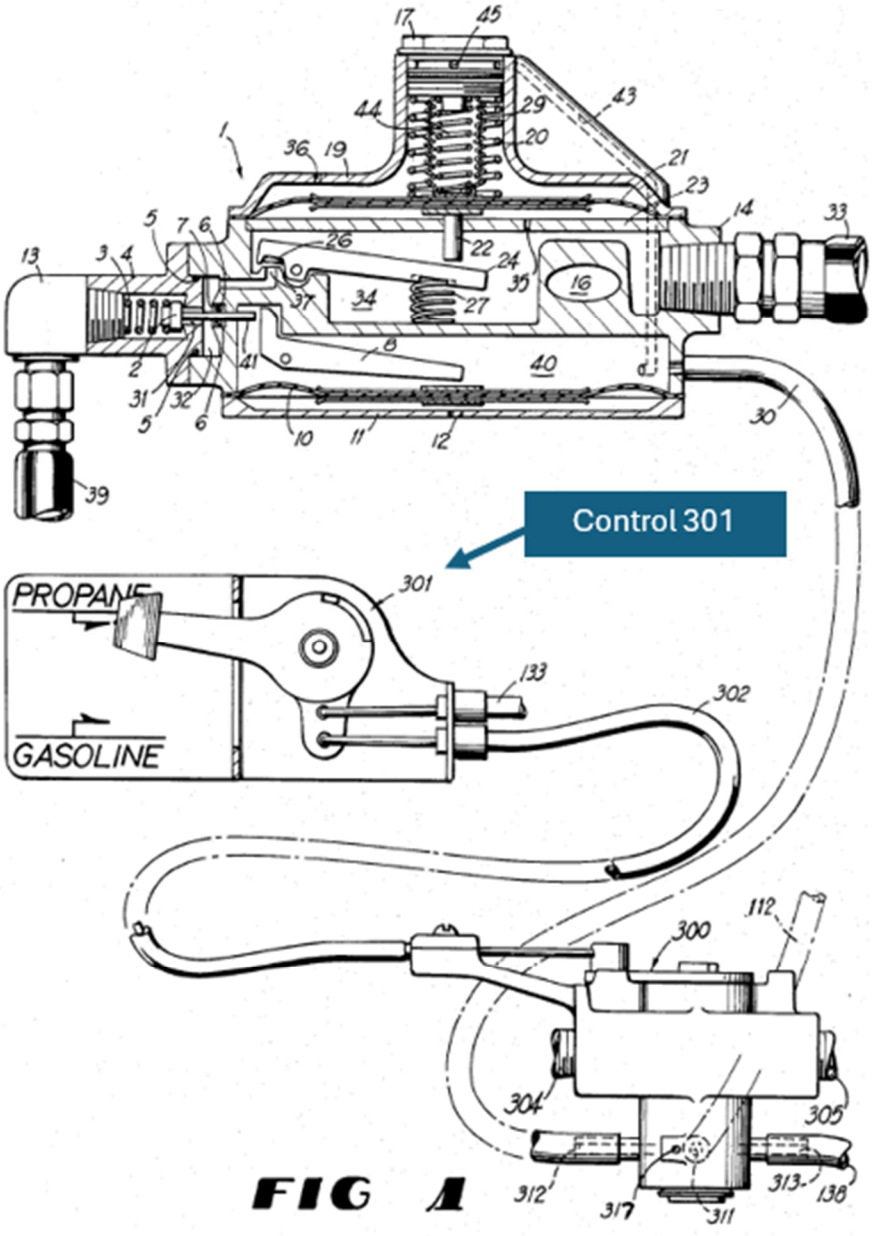
FIG. 2

Id., Figs. 1-2.

F. U.S. Patent No. 4,492,207 ("Hallberg")

Hallberg issued in 1985. EX1006. Hallberg is prior art under §102(a).

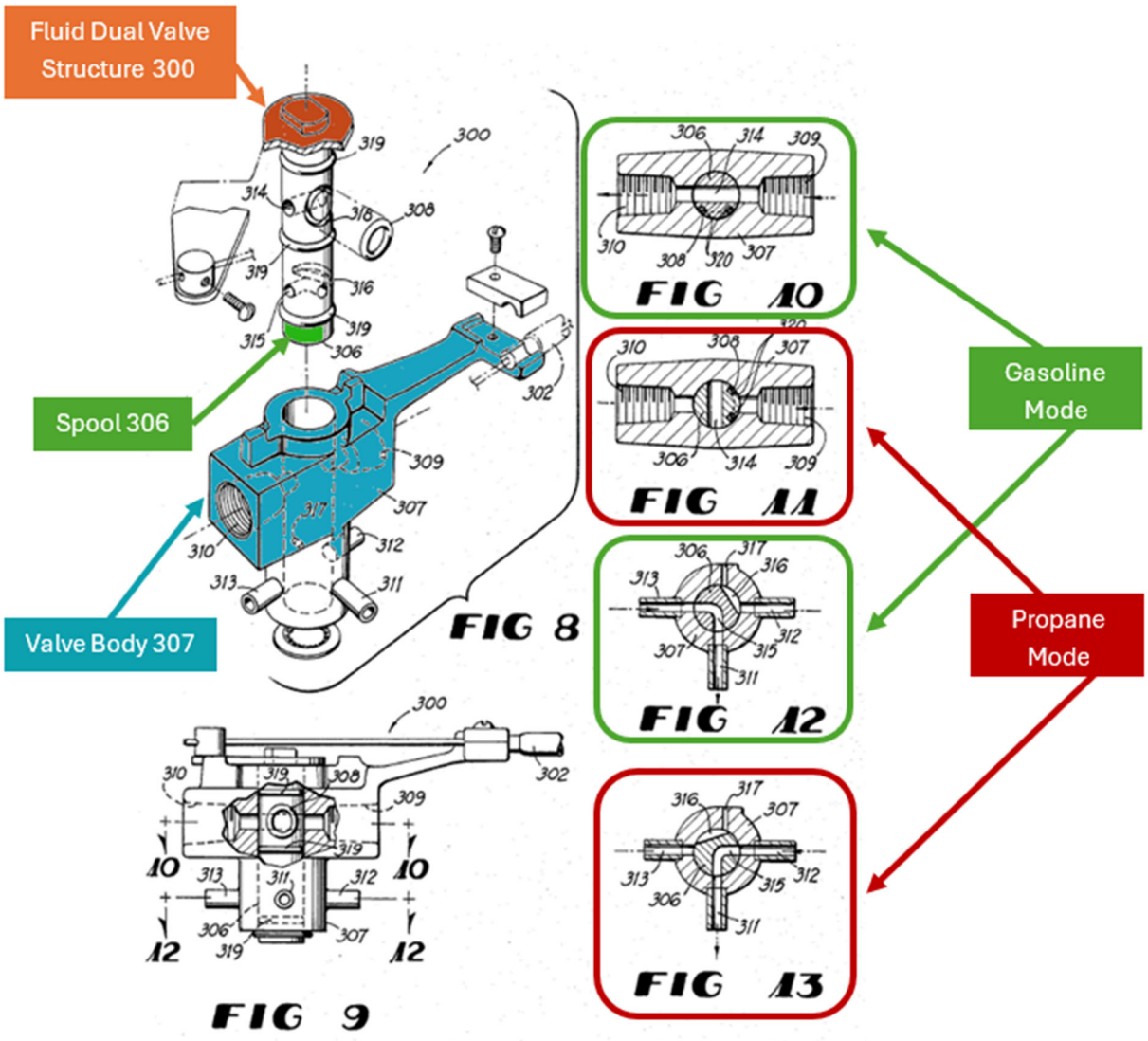
Hallberg discloses a dual-fuel system for use with internal combustion engines. EX1006, Abstract. The fuel type is selected by positioning control 301 in one of two positions, either "gasoline" or "propane." *Id.*, 7:27-29, Fig. 1.



Id., Fig. 1 (annotated).

Positioning of control 301 in "gasoline" mode acts through control cable 302 to rotate spool 306 within valve body 307. *Id.*, 7:30-38. Gasoline from gasoline supply line 304 is supplied to carburetor 110 through engine gasoline line 305, which lines communicate through tunnel 314 connecting liquid inlet opening 309 and liquid outlet opening 310 in fluid dual valve 300. In this mode, the carburetor functions normally. *Id.*, 7:38-44; Fig. 10.

When the "propane" mode of control 301 is selected, spool 306 is rotated within valve body 307 by control cable 302 such that O-ring 308 on the face of spool 306 forms a seal between spool 306 and valve body 307 around liquid inlet opening 309 thereby prohibiting flow of gasoline to carburetor 110. *Id.*, 8:3-10; Fig. 11.



Id., Figs. 8-13 (annotated).

When the engine is started, a vacuum, communicated to the engine intake manifold pressure chamber 40 via lines 112 and 30, creates a reduced pressure on the upper side of the liquid inlet diaphragm 10. *Id.*, 8:31-36. Atmospheric pressure on the opposite side of diaphragm 10 urges it upward against the liquid inlet lever 8, the opposite end of which drives inlet valve shaft 41 against bias spring 3 and

opens liquid inlet valve 2. *Id.*, 8:36-40. Upon opening valve 2, propane flows through inlet valve orifice 31 into liquified fuel passage 32 and onto the mixer 100. *Id.*, 8:40-60. When valve 2 is closed, valve 2 and related structures provide a "lock-off" of propane. *Id.*, 7:64-68.

G. LP-Gas Handbook

LP-Gas Handbook was published/publicly available in 2008. EX1017, 3; EX1003, ¶¶86-89. It is prior art under §102(a).

LP-Gas Handbook is the Eighth Edition in its series. EX. 1017, 2. It is a commentary on the 2008 edition of NFPA® 58, *Liquefied Petroleum Gas Code*, ("LP-Gas Code") and includes the full text of the code. *Id.*, 2, 24.

LP-Gas Handbook provides commentary on the definition for "Quick Connectors":

> **3.3.62 Quick Connectors.** Fittings used to connect hose assemblies to piping and valves without the use of tools.
>
> Quick connectors are used to connect transfer hose to piping and valves for loading and unloading cargo tank vehicles or railroad tank cars. They can also be used as connectors on swivel-type transfer piping. Quick connectors are also used in other LP-Gas systems, such as those used for engine fuel refueling and cylinder filling, connecting cylinders to gas-fired barbecue grills, and connecting gas systems between two sections of mobile homes.

EX1017, 40.

VII. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. Ground 1: Claims 1-3 and 11-13 are anticipated by Parlatore or, alternatively, are obvious in view of Parlatore

Claims 1-3 and 11-13 of the '985 Patent are anticipated under §102, or, alternatively, are obvious under §103, as detailed below and in the declaration of Dr. Morse. EX1003, ¶¶92-141.

1. Claim 1

a. Element [1.0]

Element [1.0] recites "a generator and fuel delivery system."

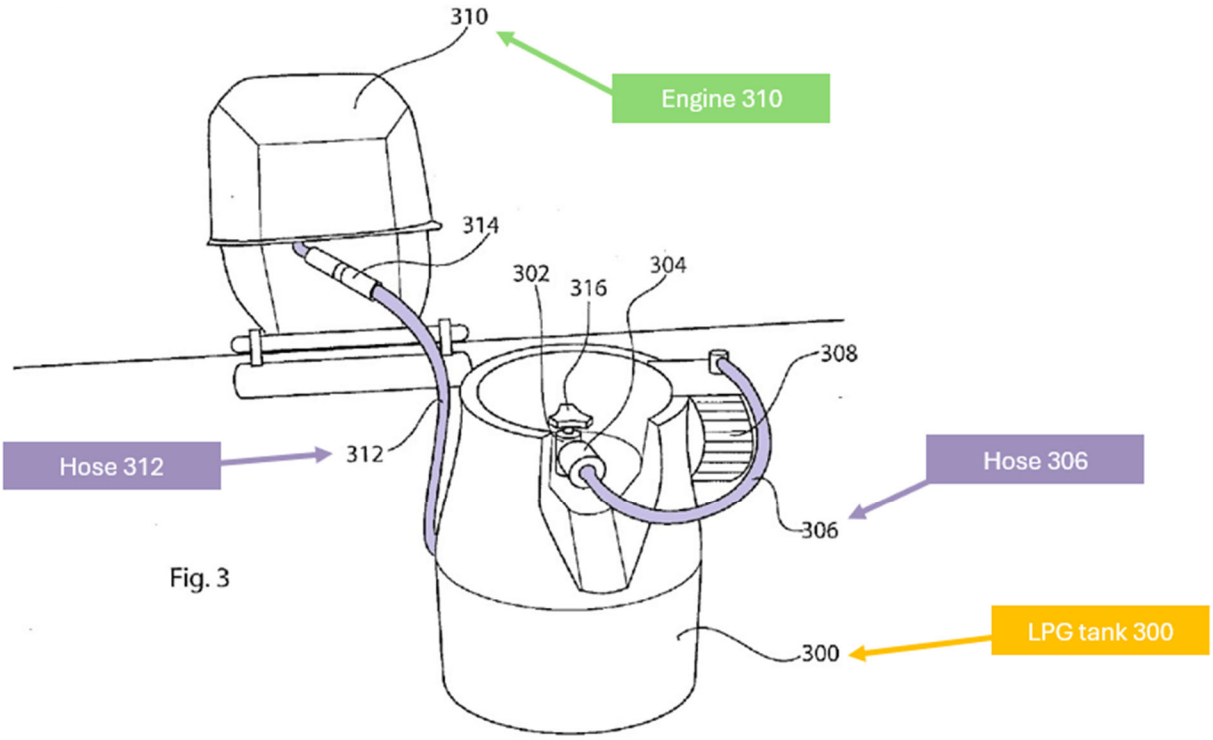
Parlatore discloses a fuel delivery system, including for use with generators. EX1010, Abstract, ¶[0013]-[0021]; EX1003, ¶94.

b. Element [1.1]

Element [1.1] recites "a generator free of any pressure regulator and configured to operate on a gaseous fuel supplied from a pressurized fuel source through a gaseous fuel line."

Parlatore discloses using its fuel delivery system with a generator, and there is no indication the generator has its own regulator. *Id.*, ¶[0019]; EX1003, ¶96. In addition, Parlatore discloses that the secondary regulator (discussed in detail below) feeds vaporized LPG into the carburetor, further indicating the engines and generators disclosed in Parlatore do not have their own pressure regulators. *Id.*, ¶¶[0016], [0018], [0020], Fig. 1; EX1003, ¶96.

Parlatore discloses an engine configured to operate on a gaseous fuel (LPG) supplied from a pressurized fuel source (LPG tank) through a gaseous fuel line (one or more hoses):



Id., Fig. 3 (annotated), Figs. 1-2, ¶¶[0013]-[0021].

Parlatore discloses the LPG tank is pressurized. *Id.*, ¶[0016] (LPG in tank is in a "high pressure state," which is "approximately 180-250 psi"). The LPG is in gaseous state when delivered to the engine through a gaseous fuel line (one or more hoses). *Id.*, ¶¶[0017] (system lets "fuel vapor flow into the carburetor 114"), [0018] (system feeds "vaporized propane into carburetor 114 through hose 112"), [0022], [0025]; EX1003, ¶97.

c. Element [1.2]

Element [1.2] recites "a fuel regulator system located off-board the generator and comprising a first stage and a second stage."

Parlatore discloses a fuel regulator system with a primary regulator (first stage) and a secondary regulator (second stage): "The fuel delivery system may include a fuel tank that houses propane; a ***first regulator*** coupled to the fuel tank; a ***second regulator*** coupled to the first regulator; and a fuel metering system coupled to the second regulator and delivering propane to an engine." *Id.*, ¶[0005]; *see also id.* ¶¶[0006], [0016]-[0021], Figs. 1-3; EX1003, ¶99.

Parlatore discloses the fuel regulator system may be "off-board" (i.e., "separate" from) the engine:

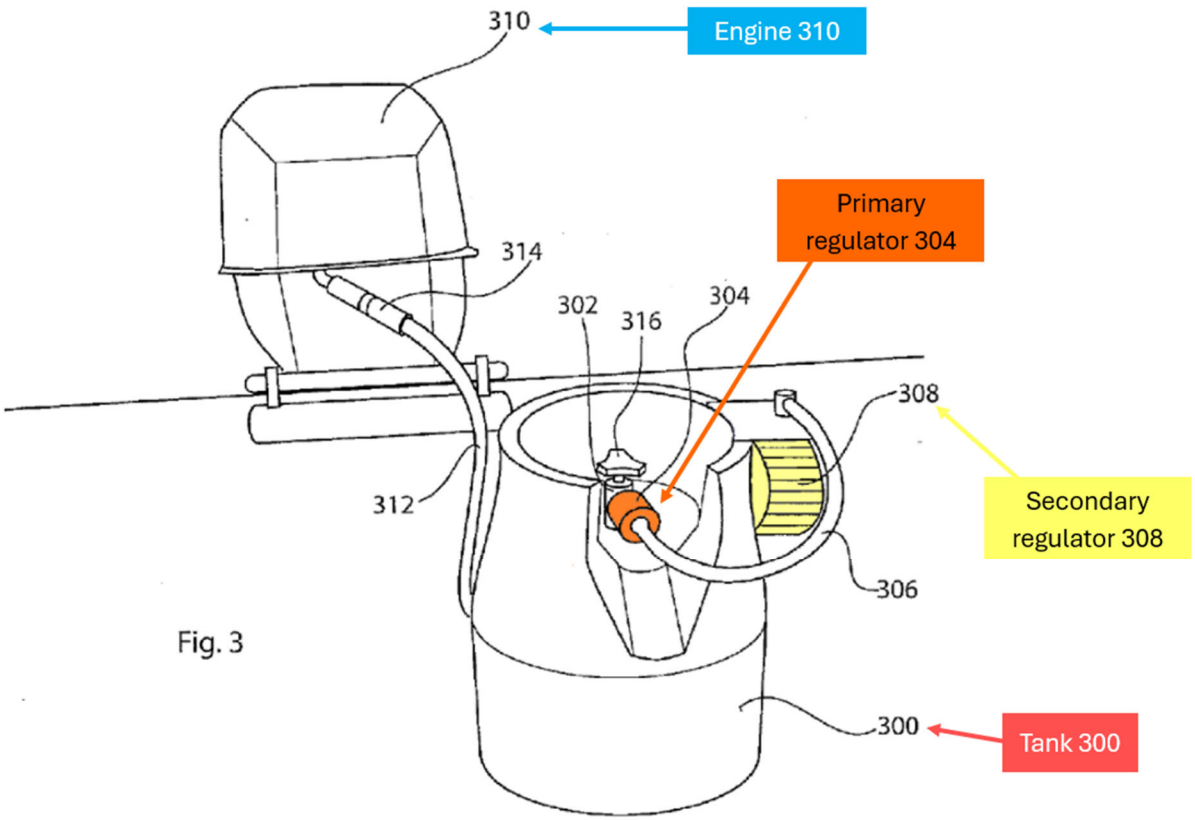


Fig. 3

Id., Fig. 3 (annotated); ¶[0020]; EX1003, ¶100.

Parlatore discloses the embodiment of Figure 2 with a generator and discloses the embodiment of Figure 3 for "any situation where more fuel may be desired." *Id.*, ¶¶[0019], [0024]. Parlatore also discloses its "LPG applications may be used on any desired form of engine." *Id.*, ¶[0025]; *see also id.* ¶[0012] ("the term 'embodiments of the invention' does not require that all embodiments of the invention include the discussed feature, advantage or mode of operation"), ¶[0026] ("the invention should not be construed as being limited to the particular embodiments discussed above"); ¶[0027] ("the above-described embodiments

should be regarded as illustrative rather than restrictive" and "variations to those embodiments can be made by those skilled in the art").

Therefore, Parlatore teaches the embodiment of Figure 3 (where the fuel regulator system is "off-board" the engine) for use with any engine (including in the context of a generator, such as the generators mentioned in paragraph [0019]), such that the fuel regulator system would be "off-board" a generator. *Id.*, ¶¶[0019], [0012], [0024]-[0027]; EX1003, ¶102.

Additionally, it would have been obvious to a POSA to use the Parlatore embodiment shown in Figure 3 with a generator. EX1003, ¶103.

i. Motivation/Expectation of Success

A POSA would have been motivated by Parlatore's own teaching to use the embodiment of Figure 3 for "any situation where more fuel may be desired." EX1010, ¶[0024]; EX1003, ¶104. For example, using tank sizes commonly available in the U.S., it appears that the tank shown in Figure 2 has a capacity of 1 lb. EX1003, ¶104. By contrast, the tank shown in Figure 3 would have a much larger capacity (e.g., 10 lbs.). *Id.* If a POSA had a 4 horsepower generator, they would find that at 75% load, a 1 lb. tank would only run their generator for approximately 0.5 hours. *Id.* By contrast, a 10 lb. tank would provide power for 4.5 hours. *Id.* To power essential appliances during a power outage lasting a few hours, a POSA would know to utilize a larger propane tank, such as the 10 lb. tank

considered in this example. *Id.* A POSA would also have been motivated to use Parlatore's off-board configuration of Figure 3 to provide fuel to a generator with a larger engine having greater electricity output, because a larger engine would need more fuel. *Id.*

In addition, tanks like those shown in Parlatore's Figure 3 were readily available and common household items at the time of the invention, particularly due to the prevalence of propane exchange programs by hardware stores and other retail outlets. *Id.*, ¶105.

Further, by locating the regulator outside the engine, the risk of over-pressurization, leaks, or explosions near the generator is reduced. *Id.*, ¶106.This is particularly important for generators used in residential or portable settings, where safety is paramount. *Id.*

Placing the regulator outside the generator also reduces the overall size of the generator unit, which is beneficial for portable generators or installations with space constraints. *Id.*, ¶107.

Parlatore shows that a POSA would have had a reasonable expectation of success using an off-board fuel regulator system with a generator. EX1010, ¶¶[0019]-[0022], [0024], Fig. 3; EX1003, ¶108. In addition, it was common to connect appliances, such as BBQ grills, to off-board regulators and propane tanks at the time of the invention and the fuel delivery system of Parlatore would operate

the same way regardless of whether the system is mounted to the engine/generator or located off-board the engine/generator. EX1003, ¶108.

d. Element [1.3]

Element [1.3] recites "regulate the gaseous fuel supplied from the pressurized fuel source in the first stage, the gaseous fuel regulated down to a reduced pressure in the first stage."

Parlatore discloses the gaseous fuel (LPG) supplied from the pressurized fuel source (LPG tank) is regulated down to a reduced pressure (through the primary regulator) in the first stage:

> ***The primary regulator 106 may step down the pressure of any stored propane vapor energy in tank 102***, and may further output this lowered pressure to a secondary regulator 110. For example, ***the primary regulator 106 may be such that it reduces pressure of the propane from a high pressure state while the propane is in the LPG tank 102, which may be approximately 180-250 psi, to a sub-atmospheric pressure, approximately 10 psi***.

Id., ¶[0016] (emphasis added); *see also id.* ¶¶[0005]-[0006], [0017]-[0021], Figs. 1-3; EX1003, ¶110.

e. Element [1.4]

Element [1.4] recites "regulate the reduced pressure gaseous fuel in the second stage, the reduced pressure gaseous fuel from the first stage regulated down

to a desired pressure in the second stage for delivery through the gaseous fuel line to operate the generator."

Parlatore discloses regulating the reduced pressure gaseous fuel (i.e., LPG that has exited the primary regulator) in the second stage down to a desired pressure in the second stage (through the secondary regulator) for delivery through the gaseous fuel line (e.g., hose 112) to operate the generator. *Id.*, ¶¶[0005]-[0006], [0016]-[0021], Figs. 1-3; EX1003, ¶112. Parlatore discloses using the LPG regulated down to the second stage to operate the generator because it flows from the secondary regulator to the carburetor through a hose (e.g., hose 112). *Id.*, ¶¶[0017]-[0018], [0020], Figs. 1-3; EX1003, ¶112.

2. Claim 2

Claim 2 depends from claim 1, and further recites "wherein the first and second stages comprise a dual stage regulator configured to regulate the gaseous fuel supplied from the pressurized fuel source and regulate the reduced pressure gaseous fuel."

Parlatore discloses "the regulator arrangement of the primary regulator 106 and the secondary regulator 110 may be such that they are combined as a single, two-stage, regulator 202." EX1010, ¶[0018]; *see also id.*, claim 8, Fig. 2. In this way, the primary regulator and secondary regulator are integral components of a dual-stage pressure regulator. *Id.*; EX1003, ¶114.

Parlatore discloses the combined, two-stage regulator 202 may be used "[i]n further exemplary embodiments," such that Parlatore also teaches the use of combined, two-stage regulator with the off-board embodiment shown in Figure 3. *Id.*, ¶[0018]; EX1003, ¶115.

The primary regulator within the combined regulator 202 regulates the gaseous fuel supplied from the pressurized fuel source to a reduced stage. EX1010, ¶¶[0005]-[0006], [0016]-[0022]; EX1003, ¶117. The secondary regulator within the combined regulator 202 further regulates the gaseous fuel from the primary regulator for delivery to the engine. *Id.*

3. Claim 3

Claim 3 depends from claim 2, and further recites "wherein the dual stage regulator is mounted directly onto the pressurized fuel source, off-board from the generator."

Parlatore discloses the secondary pressure regulator can be mounted directly onto the propane tank, off-board the engine:

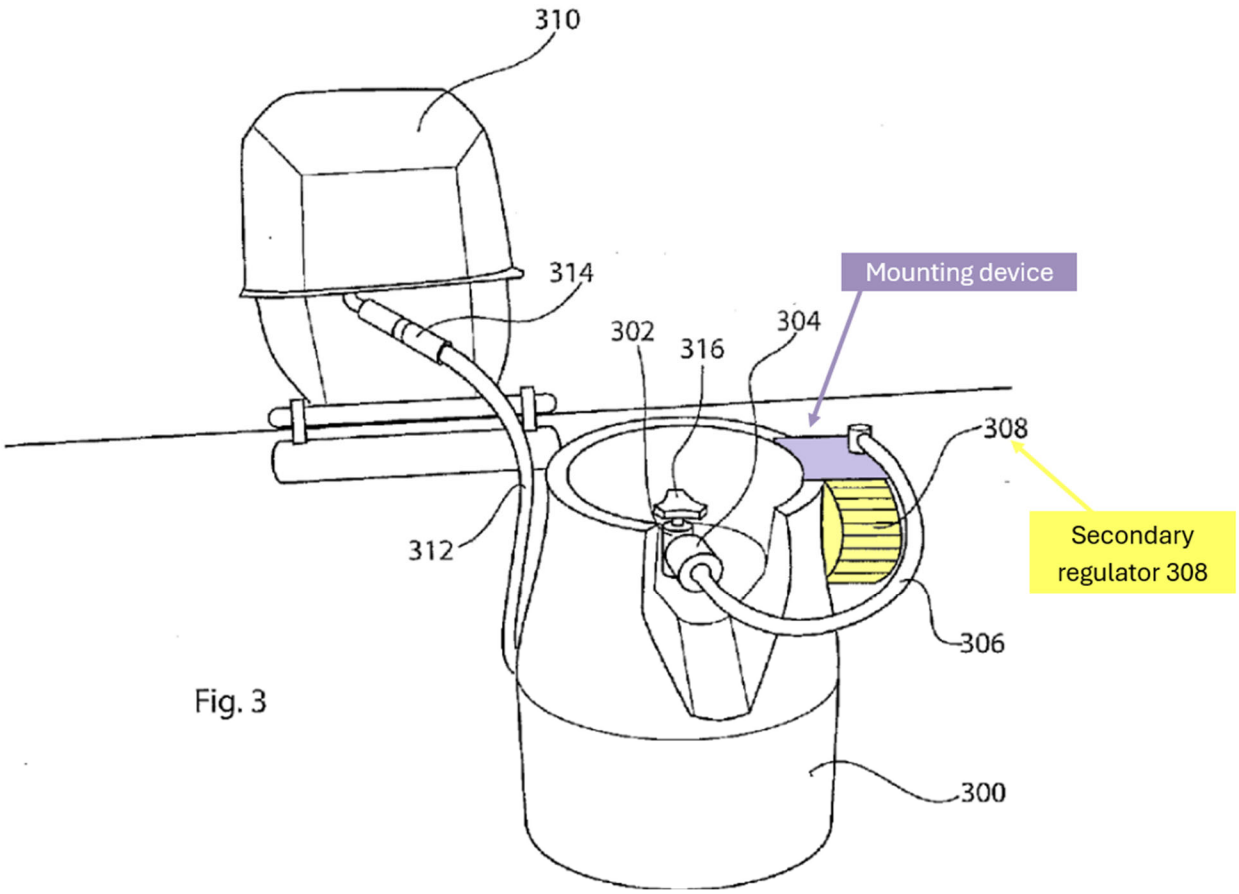


Fig. 3

EX1010, Fig. 3 (annotated); EX1003, ¶119.

Parlatore also discloses the primary and secondary regulators can be combined as a single, two-stage regulator 202. *Id.*, ¶[0018]. Parlatore discloses the combined, two-stage regulator 202 may be used "[i]n further exemplary embodiments," such that Parlatore also teaches use of a combined, two-stage regulator with the off-board embodiment shown in Figure 3. *Id.*, ¶[0018]. Using the same mounting arrangement from Figure 3 with the combined regulator 202, the combined, two-stage regulator 202 would be mounted onto the tank, off-board the generator. *Id.*, ¶[0018], Fig. 3; EX1003, ¶120.

Alternatively, it would have been obvious to a POSA to mount a dual-stage regulator directly to the tank, off-board the generator given Parlatore teaches (1) a dual-stage regulator (combined regulator 202) for use with a generator in one embodiment (Figure 2); and (2) mounting the secondary regulator 308 to the tank, off-board an engine, in another embodiment (Figure 3). EX1010, ¶¶[0018]-[0021], Figs. 2-3; EX1003, ¶121.

a. Motivation/Expectation of Success

A POSA would have been motivated to use a dual-stage regulator with the embodiment of Figure 3 because dual-stage regulators were readily available at the time of the invention, and it would be more practical, lighter, and less expensive to use a single component (a dual-stage regulator) rather than two components (separate primary and secondary regulators) to achieve the same purpose. EX1003, ¶122. A POSA would have been motivated to mount the dual-stage regulator to the tank (in the same way shown in Figure 3) to avoid straining the connections between the dual-stage regulator and the tank from the weight of the dual-stage regulator. *Id.*

Mounting the dual-stage regulator directly to the tank ensures that any potential leaks or failures in the high-pressure section occur at the tank, far from the generator and its ignition sources. *Id.*, ¶123. This reduces the risk or fire or explosion, a critical consideration given propane's flammability. *Id.* Also,

generators vibrate during operation, which can stress regulator components and lead to wear or failure. Attaching the regulator to the stationary tank protects it from these vibrations, improving safety and durability. *Id.*

Additionally, mounting the dual-stage regulator on the tank minimizes the length of high-pressure hose needed between the tank and the regulator. *Id.*, ¶124;. This simplifies the fuel system and lowers the risk of damage to the high-pressure hose. *Id.*; *see also infra* §VII.C.1.e.

Parlatore shows that a POSA would have had a reasonable expectation of success mounting the secondary regulator to the tank, and mounting a combined, dual-stage regulator would be no different and would not have an impact on the performance of the fuel delivery system. EX1010, Fig. 3; EX1003, ¶125.

4. Claim 11

a. Element [11.0]

As discussed, Parlatore discloses this element. *Supra* §§VII.A.1.a-VII.A.1.c.

b. Element [11.1]

Parlatore discloses this element, including utilizing its fuel delivery system with a variety of engines, including those within a generator. *Supra* §VII.A.1.b; EX1010, ¶[0019].

c. Element [11.2]

As discussed, Parlatore discloses this element. *Supra* §VII.A.1.c.

d. Element [11.3]

As discussed, Parlatore discloses this element. *Supra* §VII.A.1.d.

e. Element [11.4]

As discussed, Parlatore discloses this element. *Supra* §VII.A.1.e.

f. Element [11.5]

Parlatore discloses the LPG regulated down to the second stage by the fuel regulator system is used to operate the generator at the second reduced pressure because the LPG flows from the secondary regulator to the carburetor through a hose (e.g., hose 112). *Id.*, ¶¶[0017]-[0018], Fig. 1-3; EX1003, ¶137.

5. Claim 12

As discussed, Parlatore discloses the elements of this claim. *Supra* §VII.A.2.

6. Claim 13

As discussed, Parlatore discloses the elements of this claim and, additionally, this configuration was obvious. *Supra* §VII.A.3.

B. Ground 2: Claims 7-10 are obvious over Parlatore in view of LP-Gas Handbook

Claims 7-10 of the ’985 Patent are obvious under §103, as detailed below and in the declaration of Dr. Morse. EX1003, ¶¶142-167.

1. Claim 7

Claim 7 depends from claim 1.

a. Element [7.1]

Element [7.1] recites "the first stage comprises a primary pressure regulator and the second stage comprises a secondary pressure regulator."

Parlatore discloses a primary regulator 106 for the first stage and a secondary regulator 110 for the second stage (304 and 308 in Figure 3). EX1010, ¶¶[0016]-[0021], Figs. 1-3; EX1003, ¶145.

b. Element [7.2]

Element [7.2] recites "wherein the generator and fuel delivery system further comprises a quick-connect hose coupling including: a first end coupled to an outlet of the secondary pressure regulator; and a second end coupled to an inlet of the gaseous fuel line to couple the secondary pressure regulator to the gaseous fuel line."

Parlatore does not explicitly disclose which type of hose coupling it uses. However, LP-Gas Handbook discloses the use of quick-connect couplings in LP-gas systems. EX1017, 40 (§3.3.62 commentary: "Quick connectors are also used in other LP-Gas systems, such as those used for engine fuel refueling and cylinder filling, connecting cylinders to gas-fired barbecue grills, and connecting gas systems between two sections of mobile homes.").

It would have been obvious to a POSA to use a quick connector at the end of the Parlatore hose (e.g., as coupling 314) in view of the teachings of the LP-Gas Handbook. EX1003, ¶148.

i. Motivation/Expectation of Success

A POSA would have been motivated to use a quick connector because Parlatore states that the secondary regulator may be connected to the carburetor or engine "either permanently or releasably" (EX1010, ¶[0020]) and refers to "releasably coupling the second regulator to the engine" (*id.*, claim 10, 15). EX1003, ¶149.

A POSA would have understood that a quick-connect could be used to achieve the releasable connection as coupling 314:

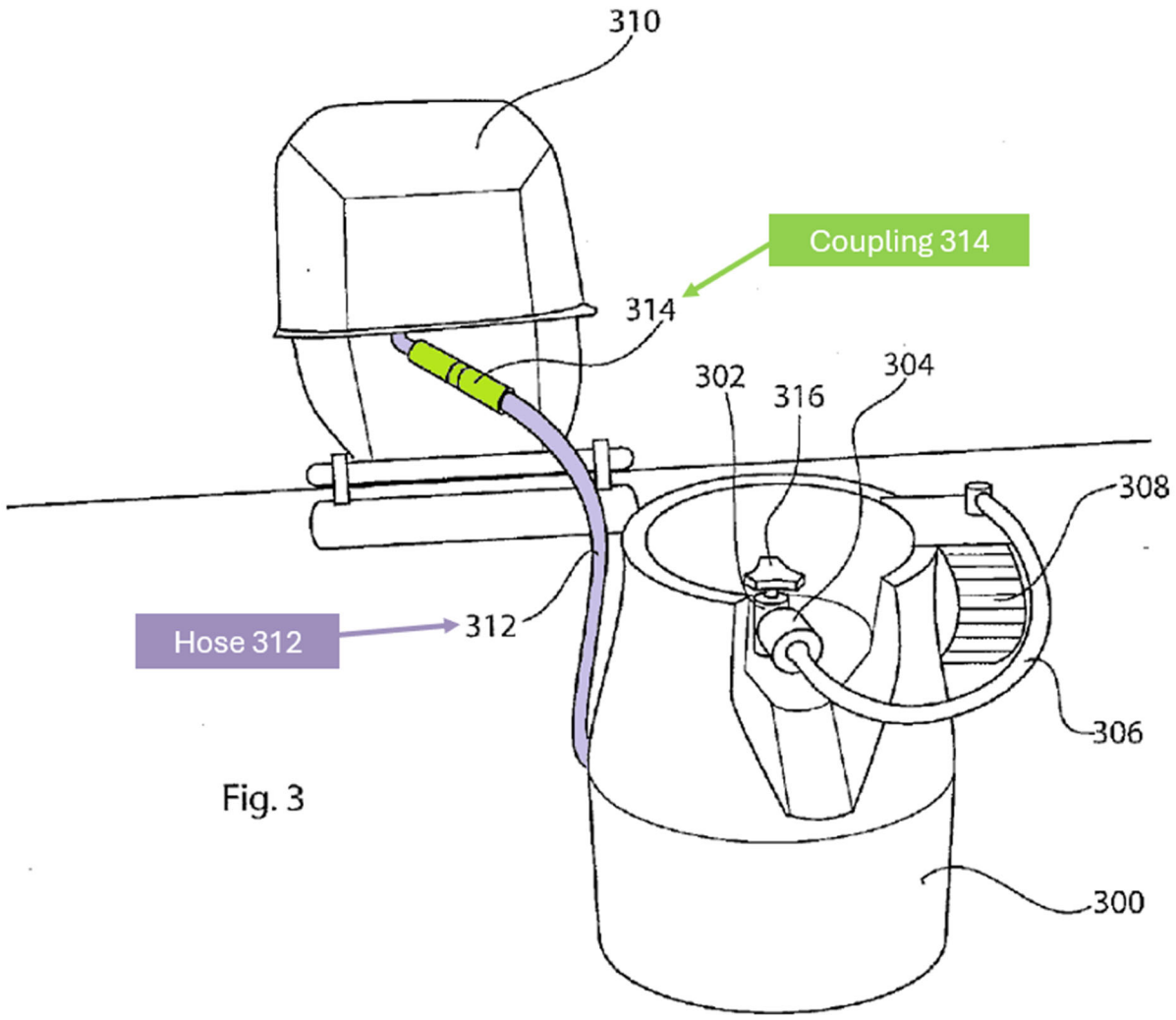


Fig. 3

Id., Fig. 3 (annotated). EX1003, ¶150.

As such, a first end would be coupled to the outlet of the secondary regulator 308 and a second end would be coupled to an inlet of the gaseous fuel line of the engine to couple the secondary pressure regulator to the gaseous fuel line. *Id.*

At the time of the invention, quick-connect couplings were a standard, well-understood solution for fuel lines where connections need to be secure but detachable, safe against leaks, and tool-free for ease of service. EX1003, ¶152;

EX1017, 40 (§3.3.62: "**Quick Connectors**. Fittings used to connect hose assemblies to piping and valves without the use of tools.").

A POSA would have also been motivated to use a quick connector for easy connection and disconnection of Parlatore's LPG tank for refilling the tank or replacing an empty tank with a full tank. EX1003, ¶153. A POSA would have been further motivated to provide for easy connection/disconnection so that the tank could be used for other common applications when not in use by the generator, such as a BBQ grill. *Id.* A POSA would have been further motivated to use a quick connector to allow easy and rapid connection and disconnection so that the portable generator could be more easily moved to other locations or could be stored when not in use. *Id.*

Additionally, many quick connectors stop gas flow when disconnected, preventing propane from escaping during tank swaps or maintenance. *Id.*, ¶154. This is especially valuable in off-board regulator setups. *Id.*

Quick connectors also allow users to connect and disconnect the hose effortlessly, making them ideal for non-experts using portable generators in residential or emergency settings. *Id.*, ¶155. This minimizes downtime when replacing the propane tank, which is common in extended generator use or mobile applications. *Id.*

A POSA would have had a reasonable expectation of success because quick connectors were commonly used in propane and fuel systems, including portable setups like those described in Parlatore. EX1003, ¶156; EX1017, 40 (§3.3.62). The benefits of a quick-connect coupling, such as rapid setup, easy maintenance, and safety, would have been especially attractive in systems that were meant to be modular or portable, as the Parlatore system is. *See* EX1010, Fig. 3; EX1003, ¶156.

2. Claim 8

Claim 8 depends from claim 7 and further recites "a regulator mounting device secured to the pressurized fuel source with at least the secondary pressure regulator mounted on the regulator mounting device."

Parlatore discloses the secondary pressure regulator 308 is mounted on a mounting device secured to the tank:

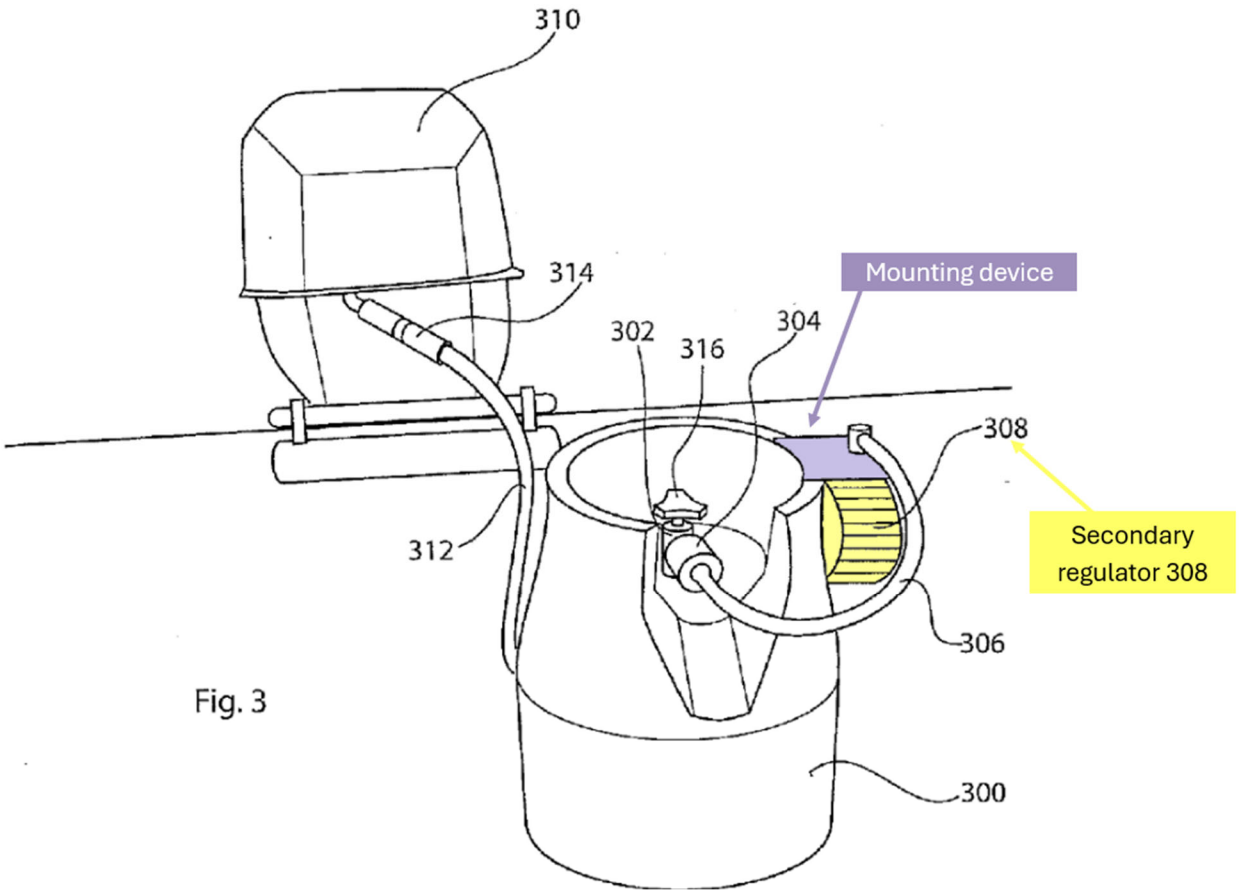


Fig. 3

Id., Fig. 3 (annotated), EX1003, ¶158. It would have been obvious to mount at least the secondary regulator to the tank (as shown in Figure 3) for the same reasons discussed. *Supra* §VII.A.3; EX1003, ¶158.

3. Claim 9

Claim 9 depends from claim 8 and further recites "the primary pressure regulator is mounted on the regulator mounting device."

Parlatore discloses that at least the secondary pressure regulator 308 is mounted on a mounting device secured to the tank:

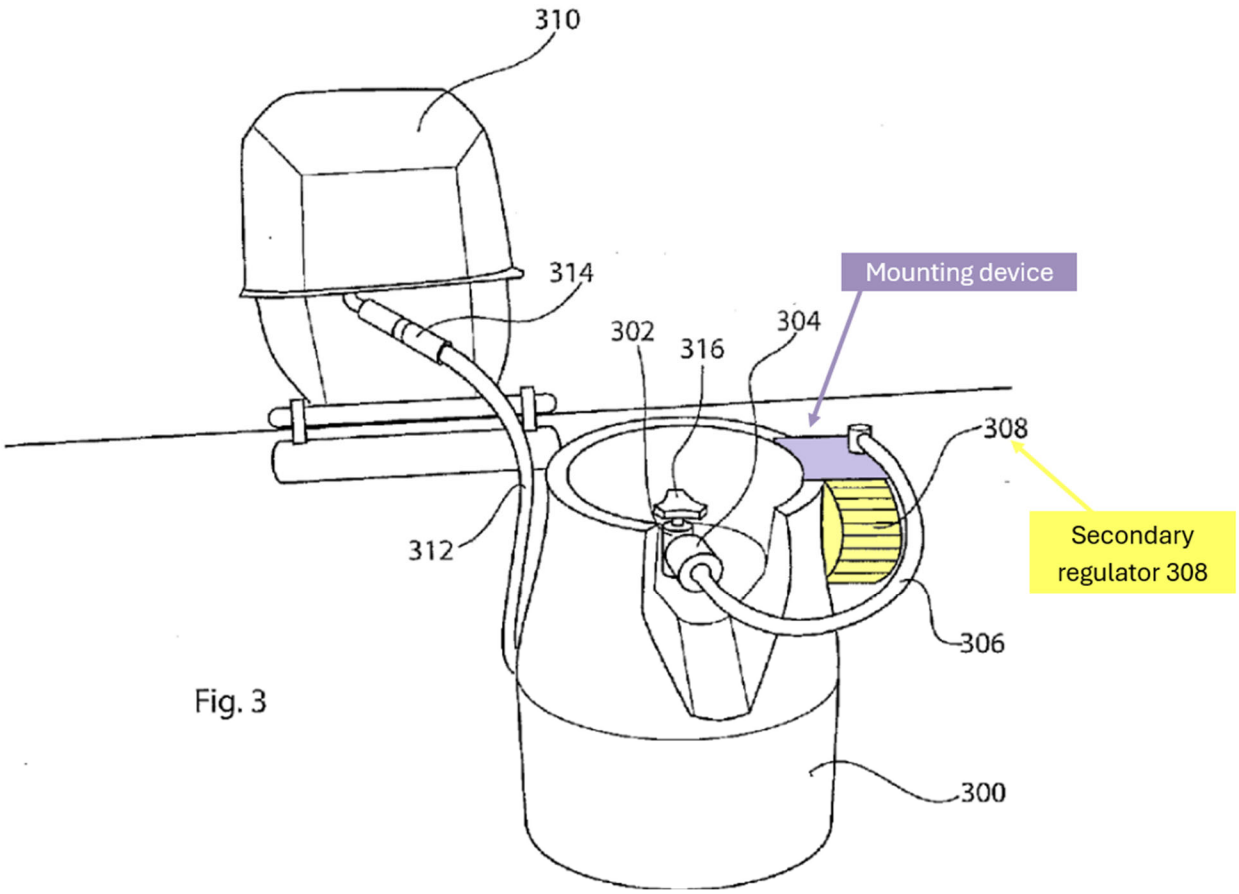


Fig. 3

Id., Fig. 3 (annotated); EX1003, ¶160.

Parlatore also discloses the primary and secondary regulators can be combined as a single, two-stage regulator. *Id.*, ¶[0018]. Parlatore discloses the combined, two-stage regulator 202 may be used "[i]n further exemplary embodiments," such that Parlatore also teaches the use of combined, two-stage regulator with the off-board embodiment shown in Figure 3. *Id.*, ¶[0018]. Using the same mounting arrangement from Figure 3 with the combined regulator 202 (instead of separate regulators), the primary pressure regulator would also be mounted on the mounting device. *Id.*, Fig. 3; EX1003, ¶161.

Alternatively, as discussed, this configuration would have been obvious. §VII.A.3.

4. Claim 10

Claim 10 depends from claim 9 and further recites "the pressurized fuel source comprises a pressurized fuel container having a collar; and wherein the regulator mounting device secures to the collar so that the primary and secondary pressure regulators are positioned adjacent each other along an outer periphery of the collar."

Parlatore discloses the mounting device secures to the collar of the propane tank:

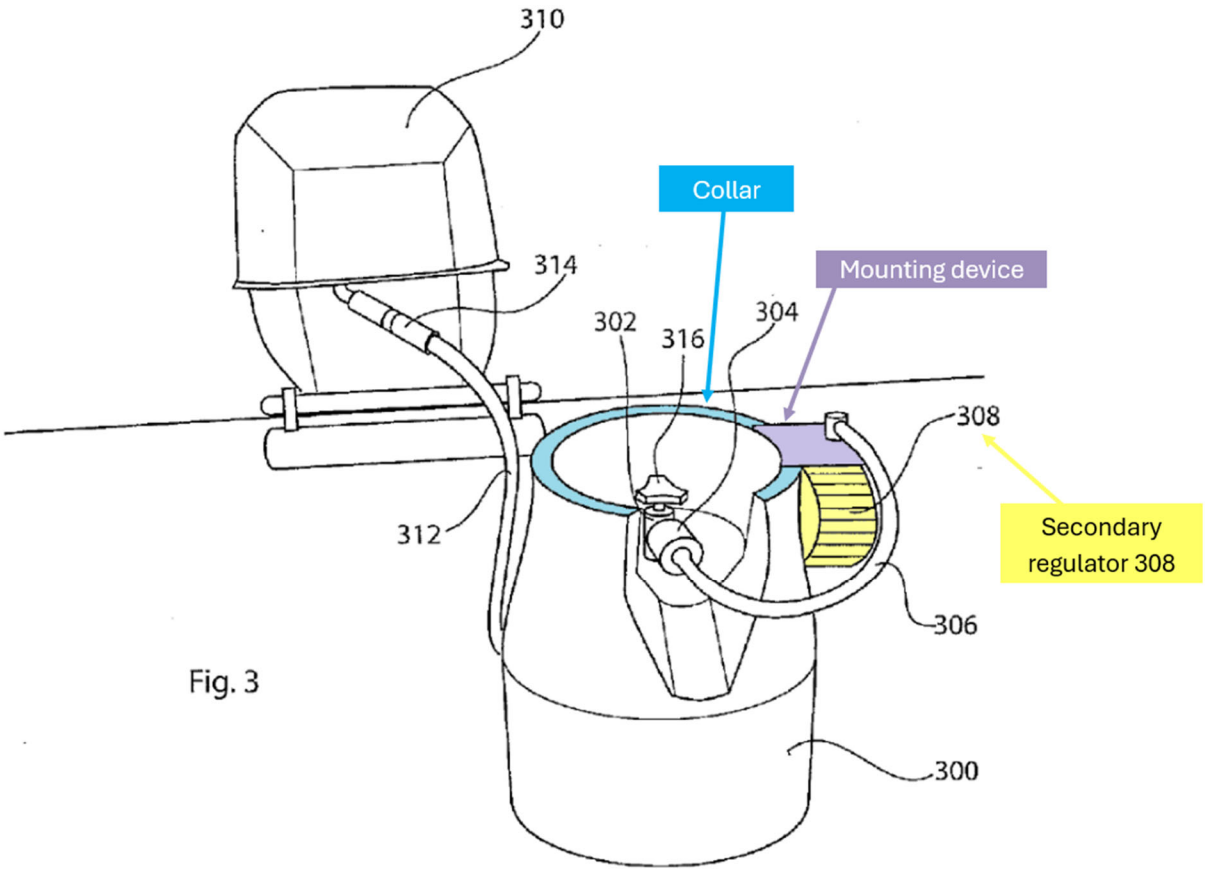


Fig. 3

Id., Fig. 3 (annotated); EX1003, ¶164.

Parlatore also discloses the primary and secondary regulators can be combined as a single, two-stage regulator 202. *Id.*, ¶[0018]. Using the same mounting arrangement from Figure 3 with the combined regulator 202 (replacing the secondary regulator 308), both the primary and secondary pressure regulators would also be mounted on the mounting device. EX1003, ¶165.

Alternatively, as discussed, this configuration would have been obvious. §VII.A.3.

In this configuration, the primary and secondary pressure regulators would be positioned adjacent each other along an outer periphery of the collar. EX1010, Fig. 3; EX1003, ¶167.

C. Ground 3: Claims 1, 4, 7, 11, 14, 16, and 18 are anticipated by the Tri-Fuel Video

Claims 1, 4, 7, 11, 14, 16 and 18 of the ’985 Patent are anticipated under §102, as detailed below and in the declaration of Dr. Morse. EX1003, ¶¶168-207

1. Claim 1

a. Element [1.0]

The Tri-Fuel Video discloses a Honda EU 2000i generator.



EX1007, 0:14.

The Tri-Fuel Video also discloses a fuel delivery system. *See generally* 1007. The Tri-Fuel Video explains that the Honda EU 2000i generator shown has been modified to alternatively run on gaseous fuel. *Id.*, 0:36–2:00. Specifically, the Tri-Fuel Video shows that a propane tank supplies gaseous fuel to the Honda EU 2000i generator via a hose and releasable quick-connection. *Id.*, 1:26-1:58. The fuel from the propane tank is de-pressurized through a series of regulators. *Id.*, 2:00–3:23.



Id., 1:58 (annotated).



Id., 3:40 (annotated).



Id., 3:52 (annotated).

b. Element [1.1]

The Tri-Fuel Video explains that the Honda EU 2000i generator was modified to run on a separate gaseous fuel source, such as propane, rather than on gasoline only. *Id.*, 0:35-1:05 (explaining that the original carburetor was modified by drilling a hole to "allow the propane or natural gas [to] get inside the carburetor if you want to use them instead of the gasoline"). The video shows that two regulators are attached to a separate propane tank for running the generator on propane. *Id.*, 1:57–2:15 (explaining that you "need two regulators").



Id., 1:58 (annotated).

There is no indication the Honda EU 2000i had a regulator on-board the generator. *See generally* EX1007. This is because the unmodified generator operated exclusively on gasoline (which does not require a pressure regulator) and was modified to run on propane or natural gas (hence the name of the YouTube video as "Honda Generator Tri-Fuel, EU2000i Triple-Fuel"). EX1007, 0:35-1:05 (original carburetor was modified to run on gas), 3:55-4:05 (the choke must be used when running on gasoline), 7:35-8:15 (explanation for running the generator on gasoline). EX1003, ¶172.

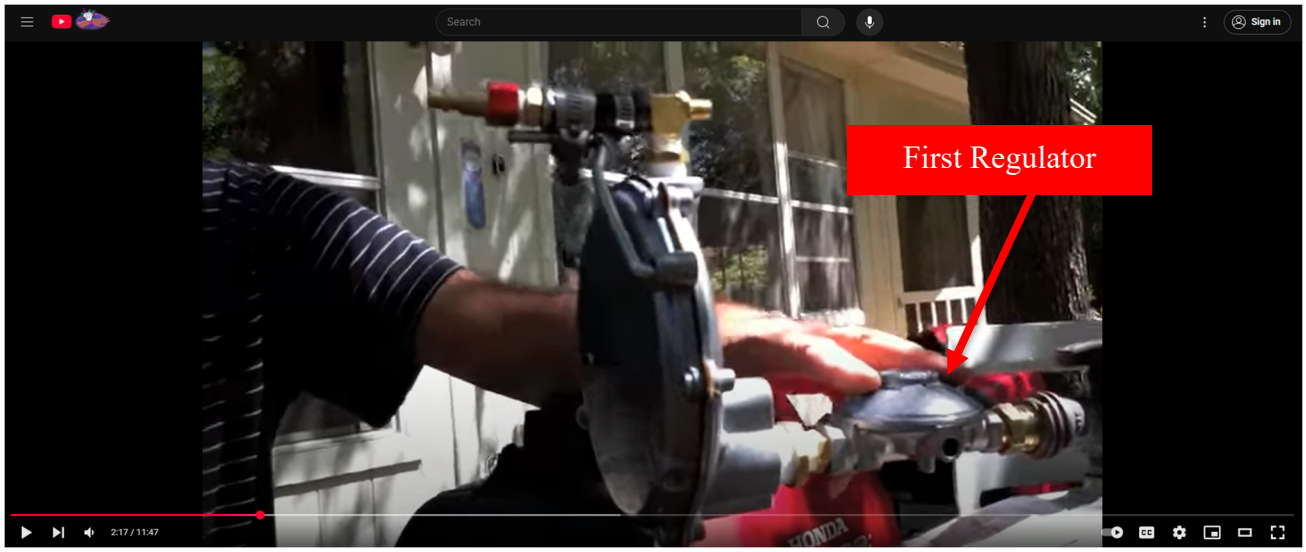
c. Element [1.2]

The Tri-Fuel Video explains that you "need two regulators" to adapt the Honda EU 2000i as shown in the video. *Id.*, 1:57–2:15. Specifically, the Tri-Fuel Video explains that the regulators work in stages: a first stage to lower the pressure

of the pressurized gas to 0.5 psi, then a second stage to lower the gas further to around -0.5 water column. *Id.*, 2:13–2:57. The video shows the regulator system (comprising the two regulators) is located off-board the generator in that it is remote and not attached to the generator. *Id.*

d. Element [1.3]

The Tri-Fuel Video explains that the first regulator in a two-regulator system reduces the pressure of the gas to about 0.5 psi. *Id.*, 2:13–2:24 ("We do need two regulators. One is a small one that is changing the high pressure of the gas to the about ½ a psi out of the first regulator.").



Id., 2:17.

e. Element [1.4]

The Tri-Fuel Video discloses a second regulator, as shown.



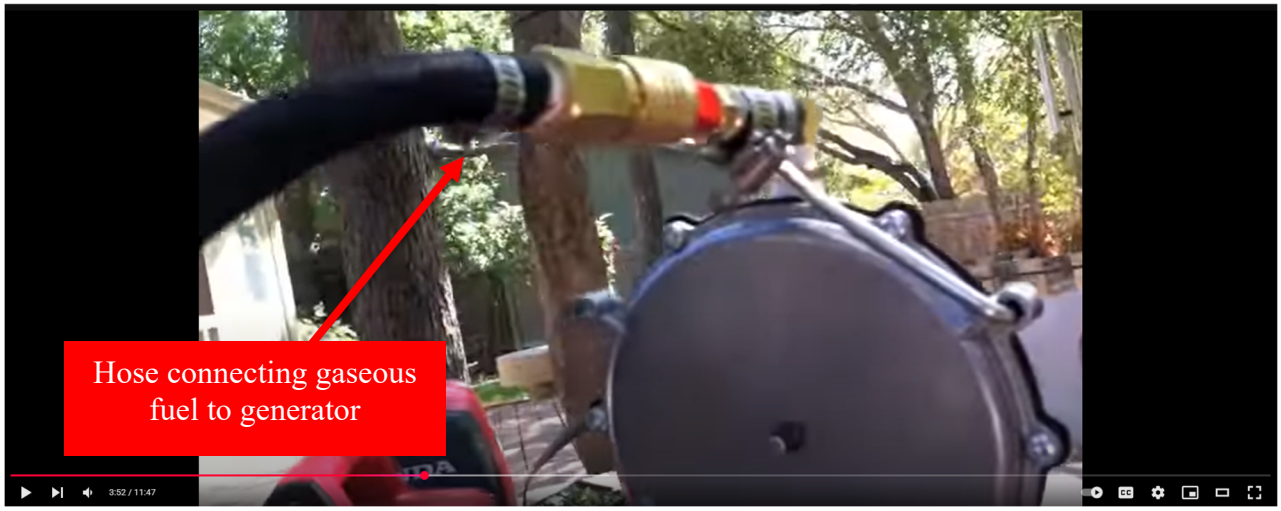
Id., 2:17 (annotated).

The Tri-Fuel video explains that the second regulator further reduces the gaseous fuel that is output from the first regulator. *See id.*, 2:24–3:23 ("The second regulator that is gonna be this one. The maximum input pressure that it can have is something around 11 water column that is gonna be every 27.5 water column is about 1 psi, so it's approximately ½ psi. The output of the second regulator has a pressure of the -0.5 water column, so it's all the time is in a vacuum or suction mode. If the vacuum or suction is not exist these regulator automatically shut the gas off so that no gas is going through. So the way that it is right now it has some sort of safety built into it in case the engine or generator goes off or something happens to the hose or disconnected, the suction goes away, and this regulator shutting off the gas flow.").

The Tri-Fuel Video shows that the generator is connected to the output of the second regulator. *Id.*, 3:36–3:53.



Id., 3:40 (annotated).



Id., 3:52 (annotated).

2. Claim 4

The video discloses the Honda EU 2000i is configured to operate on a liquid fuel (gasoline) and was modified to run on a gaseous fuel (either propane or natural

gas). EX1007, 0:30-1:05 (original carburetor was modified to run on gas), 3:55-4:05 (when running on gasoline, must use the choke), 7:30-8:15 (explanation for running the generator on gasoline). The video discloses a liquid fuel line supplying the gasoline to the carburetor:



EX1007, 8:30-8:40; EX1003, ¶178. It is inherent the gasoline is supplied from a liquid fuel source through this liquid fuel line; a POSA understood that the source is a tank within the generator:



EX1007, 0:14 (annotated to show cap for gasoline tank); EX1003, ¶178.

3. Claim 7

a. Element [7.1]

As discussed, the Tri-Fuel Video discloses this element. *Supra* §§VII.C.1.c-VII.C.1.e.

As shown below, the Tri-Fuel Video shows a primary pressure regulator and a secondary pressure regulator.



Id., 2:17.

The Tri-Fuel Video explains that you "need two regulators" to adapt the Honda EU 2000i as shown in the video. *Id.*, 1:57-2:13. Specifically, the Tri-Fuel Video explains that the regulators work in stages: a first stage to lower the pressure of the pressurized gas to 0.5 psi, then a second stage to lower the gas further to around -0.5 water column. *Id.*, 2:13–2:57.

b. Element [7.2]

The Tri-Fuel Video discloses a quick-connect hose coupling, as shown below:



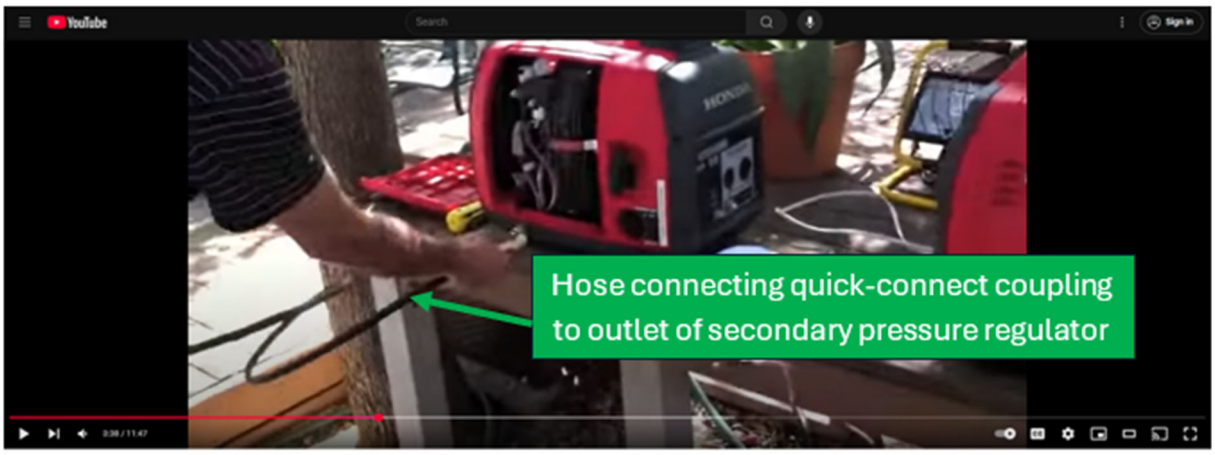
Id., 1:43 (annotated).

The commentary confirms that the coupling shown above is a "quick connect" coupling. *See id.*, 1:40–1:46 (referring to the component shown above as a "quick-connect").

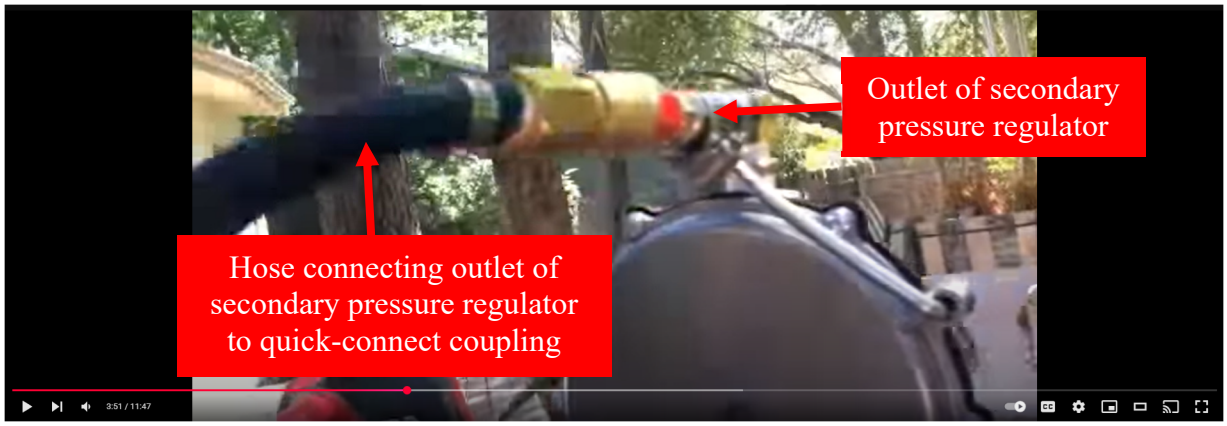
The Tri-Fuel Video explains that the secondary pressure regulator is connected to the quick-connect coupling using a 25-foot hose. *Id.*, 3:25–3:55.



Id., 3:43.

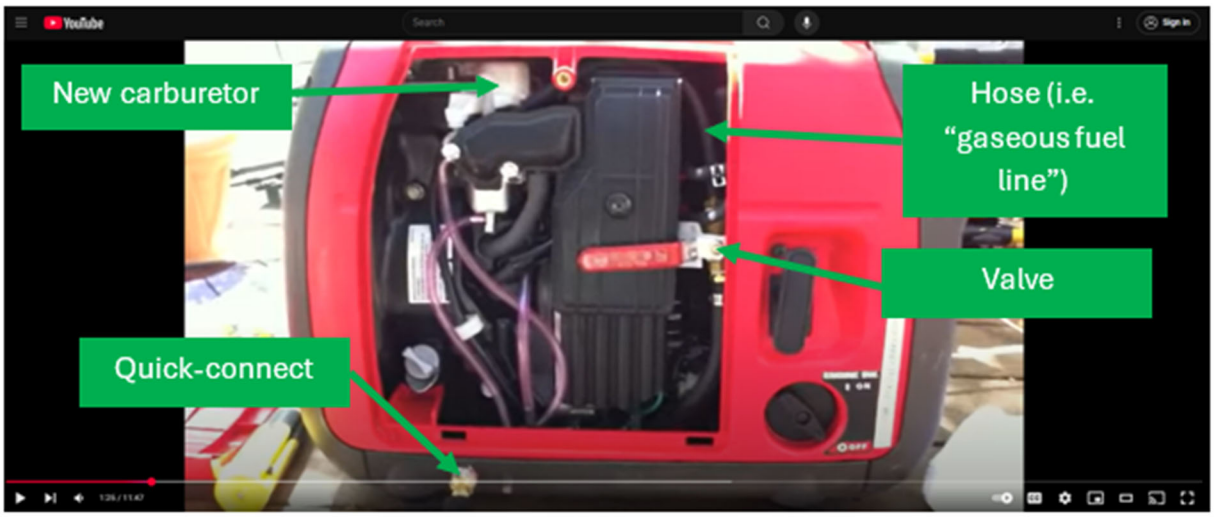


Id., 3:38 (annotated).



Id., 3:51 (annotated). As such, a first end is connected to the outlet of the secondary pressure regulator. *Id.*

The Tri-Fuel Video explains that the "new carburetor" is connected to a "hose" that goes to the "gas valve," and then down to the "quick-connect." *Id.*, 1:25-1:46.



Id., 1:25 (annotated). As such, the second end is connected to the inlet of the gaseous fuel line to couple the secondary regulator to the gaseous fuel line. *Id.*

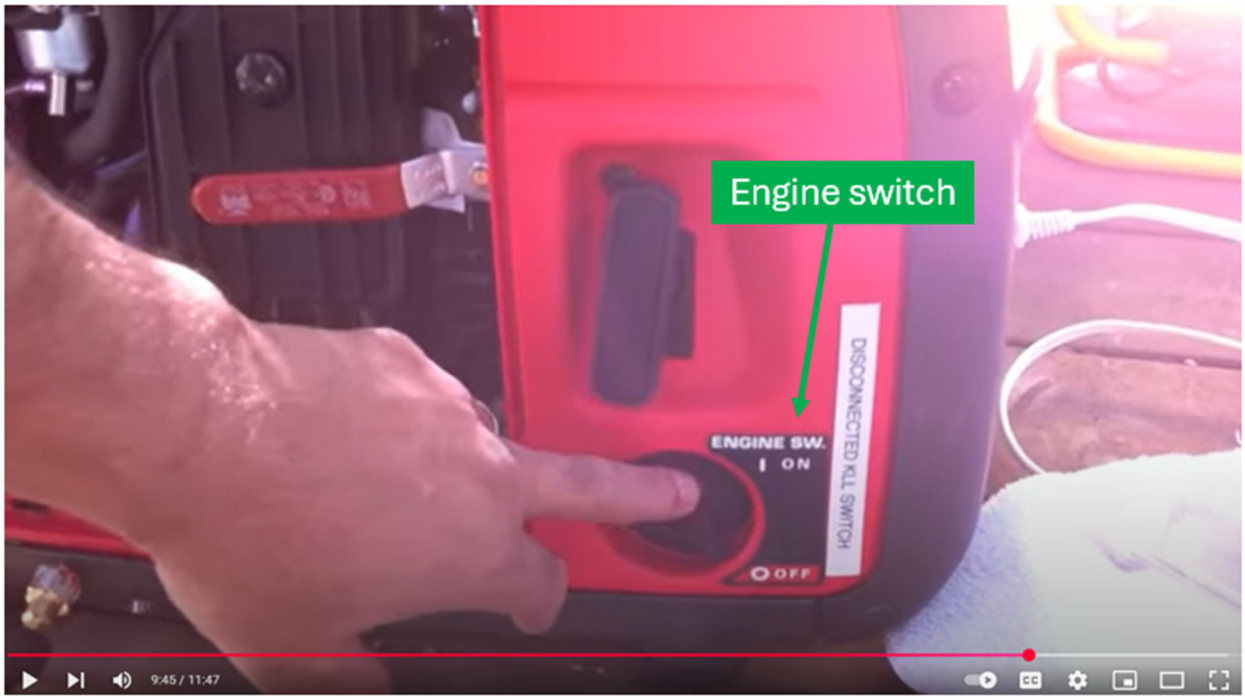
4. Claim 11

a. Element [11.0]

As discussed, the Tri-Fuel Video discloses this element. *Supra* §VII.C.1.a.

b. Element [11.1]

The Tri-Fuel Video discloses this element, including a generator comprising an engine. *Supra* §VII.C.1.b; EX1007, 9:40-10:10 (turning engine off).



Id., 9:45 (annotated).

c. Element [11.2]

As discussed, the Tri-Fuel Video discloses this element. *Supra* §VII.C.1.c.

d. Element [11.3]

As discussed, the Tri-Fuel Video discloses this element. *Supra* §VII.C.1.d.

e. Element [11.4]

As discussed, the Tri-Fuel Video this element. *Supra* §VII.C.1.e.

f. Element [11.5]

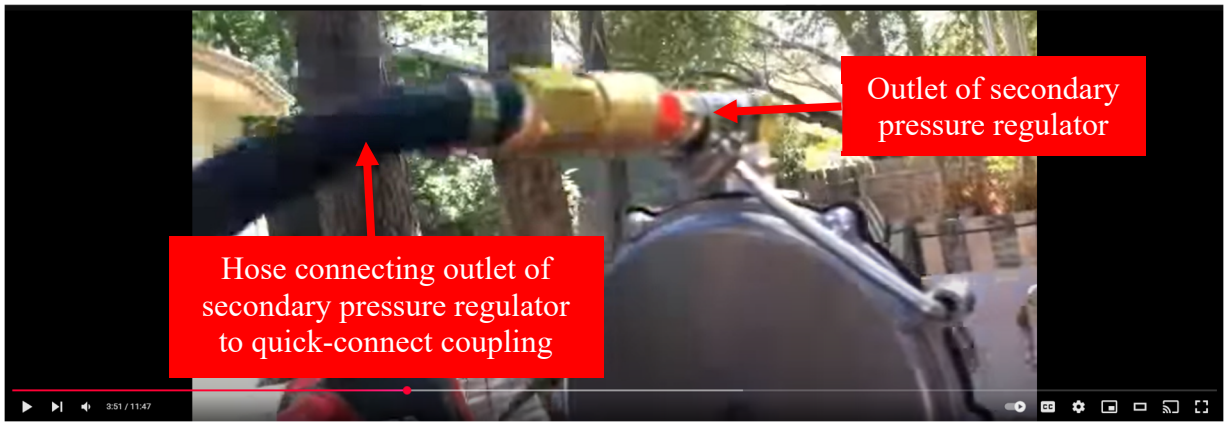
The Tri-Fuel Video shows and explains that the secondary pressure regulator is connected to the Honda EU 2000i generator through a hose, thereby outputting the gaseous LPG to the generator for operation of the engine at the second reduced pressure. *Id.*, 3:25–3:55; EX1003, ¶191.



Id., 3:43.



Id., 3:38 (annotated).



Id., 3:51 (annotated).

5. Claim 14

As discussed, the Tri-Fuel Video discloses this element. *Supra* §VII.C.2.

6. Claim 16

a. Element [16.0]

The Tri-Fuel Video discloses this element, including a dual-fuel generator. *Supra* §VII.C.1.a.

b. Element [16.1]

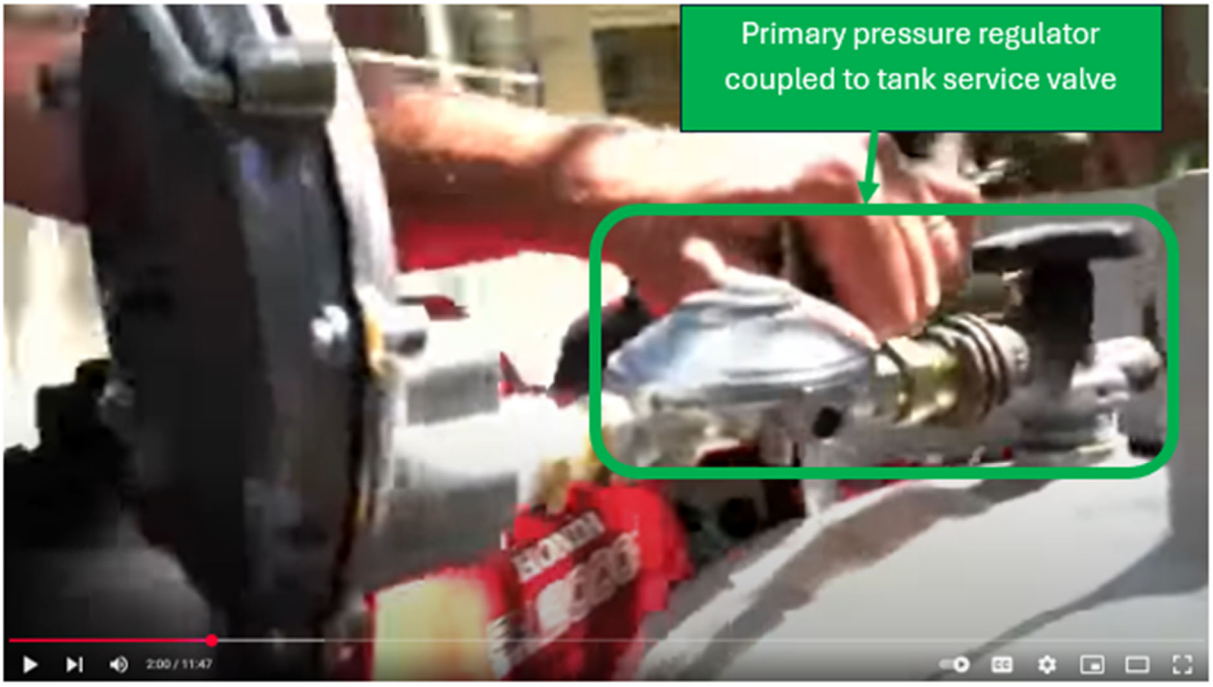
The Tri-Fuel Video discloses a dual-fuel generator configured to operate on a liquid fuel (gasoline) supplied from a liquid fuel source through a liquid fuel line (*supra* §VII.C.2) and a gaseous fuel supplied from a pressurized fuel source (LPG tank) through a gaseous fuel line (*supra* §VII.C.1.b).

c. Element [16.2]

As discussed, the Tri-Fuel Video discloses this element. *Supra* §VII.C.1.c.

d. Element [16.3]

The Tri-Fuel Video discloses this element, including coupling the primary pressure regulator to a service valve of the LPG tank. *Supra* §VII.C.1.d; EX1007, 1:55-2:05; EX1003, ¶201. The coupling of the primary pressure regulator to a service valve of the tank is shown below:



EX1007, 1:55-2:05; EX1003, ¶201.

e. Element [16.4]

As discussed, the Tri-Fuel Video discloses this element. *Supra* §VII.C.1.e.

f. Element [16.5]

As discussed, the Tri-Fuel Video discloses this element. *Supra* §VII.C.4.f

7. Claim 18

As discussed, the Tri-Fuel Video discloses the elements of this claim. *Supra* §§VII.C.3.a-VII.C.3.b.

D. Ground 4: Claims 2-3, 8-10, 12-13, 17, and 19 are obvious over the Tri-Fuel Video in view of Parlatore and LP-Gas Handbook

Claims 2-3, 8-10, 12-13, 17, and 19 of the '985 Patent are obvious under §103, as detailed below and in the declaration of Dr. Morse. EX1003, ¶¶208-234.

1. Claim 2

As discussed, the Tri-Fuel Video discloses the elements of claim 1. *Supra* §VII.C.1.

It would have been obvious to a POSA to use a combined, two-stage regulator with the dual-fuel generator disclosed in the Tri-Fuel Video, as opposed to using the two, separate regulators shown in the video. EX1003, ¶210.

As discussed, Parlatore discloses a two-stage pressure regulator having the elements of this claim in that the primary and secondary regulators are combined as integral components of a dual stage pressure regulator. *Supra* §VII.A.2; EX1003, ¶211.

LP-Gas Handbook also discloses integral two-stage regulators:

3.3.64.2 First-Stage Regulator. A pressure regulator for LP-Gas vapor service designed to reduce pressure from the container to 10.0 psig (69 kPag) or less.

3.3.64.3 High-Pressure Regulator. A pressure regulator for LP-Gas liquid or vapor service designed to reduce pressure from the container to a lower pressure in excess of 1.0 psig (6.9 kPag).

3.3.64.4 Integral 2 psi Service Regulator. A pressure regulator for LP-Gas vapor service that combines a high-pressure regulator and a 2 psi service regulator into a single unit.

3.3.64.5 Integral Two-Stage Regulator. A pressure regulator for LP-Gas vapor service that combines a high-pressure regulator and a second-stage regulator into a single unit.

3.3.64.6 Line Pressure Regulator. A pressure regulator in accordance with the *Standard for Line Pressure Regulators*, ANSI Z-21.80/CSA 6.22, with no integral overpressure protection device for LP-Gas vapor service designed for installation inside a building to reduce a nominal 2 psig inlet pressure to 14 in. w.c. (4.0 kPa) or less.

3.3.64.7 Second-Stage Regulator. A pressure regulator for LP-Gas vapor service designed to reduce first-stage regulator outlet pressure to 14 in. w.c. (4.0 kPag) or less.

3.3.64.8 Single-Stage Regulator. A pressure regulator for LP-Gas vapor service designed to reduce pressure from the container to 1.0 psig (6.9 kPag) or less.

3.3.64.9 2 psi Regulator System. An LP-Gas vapor delivery system that combines a first-stage regulator, a 2 psi (14 kPag) service regulator, and a line pressure regulator(s).

3.3.64.10 2 psi Service Regulator. A pressure regulator for LP-Gas vapor service designed to reduce first-stage regulator outlet pressure to a nominal 2 psig (14 kPag).

3.3.64.11 Two-Stage Regulator System. An LP-Gas vapor delivery system that combines a first-stage regulator and a second-stage regulator(s), or utilizes a separate integral two-stage regulator.



EXHIBIT 3.12 *Integral Two-Stage Regulator. (Courtesy of Engineered Controls International, Inc.)*

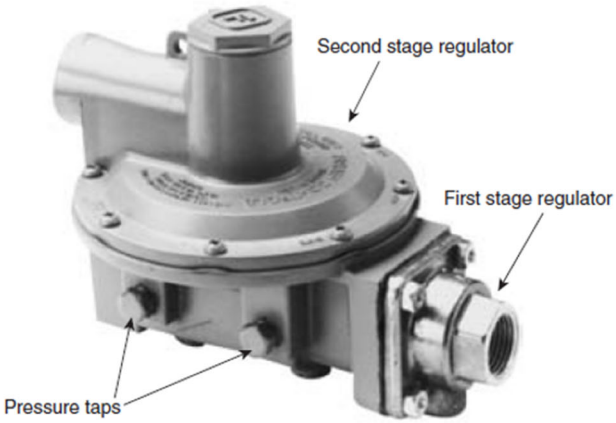


EXHIBIT 5.47 *Integral Two-Stage Regulator. (Courtesy of Fisher Controls Intl, LLC)*

EX1017, 40-41 (§3.3.64) (annotated), 41, 120; EX1003, ¶212.

a. Motivation/Expectation of Success

A POSA would have been motivated to use a combined, dual stage regulator, such as Parlatore's combined regulator 202, rather than the two, separate regulators as shown in the Tri-Fuel Video. EX1003, ¶213. A POSA would have been motivated to use a combined, dual stage regulator because it was (and is) readily available, less expensive, more compact, and easier to replace than two, separate regulators. They are particularly advantageous in portable generator applications, where minimizing the physical footprint simplifies design and installation. *Id.*

Additionally, installing one combined unit with fewer connections is faster and less complex than setting up two separate regulators, which require precise connections and alignment. *Id.*, ¶214. This simplicity reduces the likelihood of

errors, such as utilizing components with improper pressure ratings or failing to fully tighten connections, making it a practical choice for both manufacturers and end-users. *Id.* Further, a combined dual stage regulator ensures that the first stage and the second stage work seamlessly together. *Id.* The pre-calibrated setup delivers stable output pressure without the need for manual adjustments that two separate regulators may require. *Id.*

A POSA would have had a reasonable expectation of success replacing the two, separate regulators of the Tri-Fuel Video with a combined, dual stage regulator (such as Parlatore's combined regulator 202 or the two-stage regulators disclosed in the LP-Gas Handbook) because they operate in the same manner and achieve the same outcome as two regulators in series and were commonly used for similar applications at the time of the invention. *Id.*, ¶215.

2. Claim 3

As discussed, Parlatore discloses that the secondary pressure regulator can be mounted directly onto the propane tank, off-board the engine. *Supra* §VII.A.3; EX1003, ¶216. Parlatore also discloses the primary and secondary regulators can be combined as a single, two-stage regulator 202. *Id.* As discussed, using the same mounting arrangement from Figure 3 with Parlatore's combined regulator 202, the dual stage regulator would be mounted directly onto the LPG tank, which would be off-board the generator. *Id.*

Alternatively, as discussed, mounting a dual stage regulator directly to the tank, off-board the generator, would have been obvious. *Supra* §VII.A.3; EX1003, ¶217.

3. Claim 8

As discussed, Parlatore discloses the secondary pressure regulator 308 is mounted on a mounting device secured to the tank. *Supra* §VII.B.2; EX1003, ¶218. It would have been obvious to mount the Tri-Fuel Video's secondary pressure regulator in the same way for the reasons discussed above. *Supra* §VII.A.3VII.A.3; EX1003, ¶218.

4. Claim 9

As discussed, Parlatore discloses a mounting device for the secondary regulator secured to the LPG tank. *Supra* §VII.B.2; EX1003, ¶219. Parlatore also discloses the primary and secondary regulators can be combined as a single, two-stage regulator 202 and it would have been obvious to use a single, two-stage regulator with the generator of the Tri-Fuel Video. *Supra* §§VII.B.3, VII.D.1; EX1003, ¶219. As discussed, using the same mounting arrangement from Figure 3 with Parlatore's combined regulator 202, the primary pressure regulator would also be mounted via the mounting device. *Supra* §VII.B.3; EX1003, ¶219.

Alternatively, as discussed, this configuration would have been obvious. *Supra* §VII.A.3; EX1003, ¶220.

5. Claim 10

As discussed, Parlatore discloses a mounting device for the secondary regulator secured to the collar of the LPG tank. *Supra* §VII.B.4; EX1003, ¶221. Parlatore also discloses the primary and secondary regulators can be combined as a single, two-stage regulator 202 and it would have been obvious to use a single, two-stage regulator with the generator of the Tri-Fuel Video. *Supra* §§VII.B.4, VII.D.1; EX1003, ¶221. As discussed, using the same mounting arrangement from Figure 3 with Parlatore's combined regulator 202, the primary and secondary pressure regulators would also be mounted via the mounting device. *Supra* §VII.B.4; EX1003, ¶221.

Alternatively, as discussed, this configuration would have been obvious. *Supra* §VII.B.4; EX1003, ¶222.

In this configuration, the primary and secondary pressure regulators would be positioned adjacent each other along an outer periphery of the collar. *Supra* §VII.B.4; EX1003, ¶223.

6. Claim 12

As discussed, the Tri-Fuel Video discloses the elements of claim 11 (*supra* §VII.C.4) and the obvious combination of the Tri-Fuel Video and Parlatore and/or LP-Gas Handbook discloses the additional elements of claim 12 (*supra* §VII.D.1). EX1003, ¶224.

7. Claim 13

As discussed, the obvious combination of the Tri-Fuel Video and Parlatore discloses the elements of this claim. *Supra* §§VII.A.3, VII.D.2; EX1003, ¶225.

8. Claim 17

Claim 17 depends from claim 16 and further recites "wherein the primary and secondary pressure regulators are integral components of a dual stage pressure regulator."

As discussed, the Tri-Fuel Video discloses the elements of claim 16 (*supra* §VII.C.6) and the obvious combination of the Tri-Fuel Video and Parlatore and/or LP-Gas Handbook discloses the additional elements of claim 17 (*supra* §VII.D.1). EX1003, ¶¶228-230.

9. Claim 19

As discussed, the obvious combination of the Tri-Fuel Video and Parlatore disclose the elements of this claim. *Supra* §§VII.B.4, VII.D.5; EX1003, ¶¶232-233.

E. Ground 5: Claims 1, 4, 11, 14, and 16 are anticipated by Chaudhari

Claims 1, 4, 11, 14, and 16 of the '985 Patent are anticipated under §102, as detailed below and in the declaration of Dr. Morse. EX1003, ¶¶235-256.

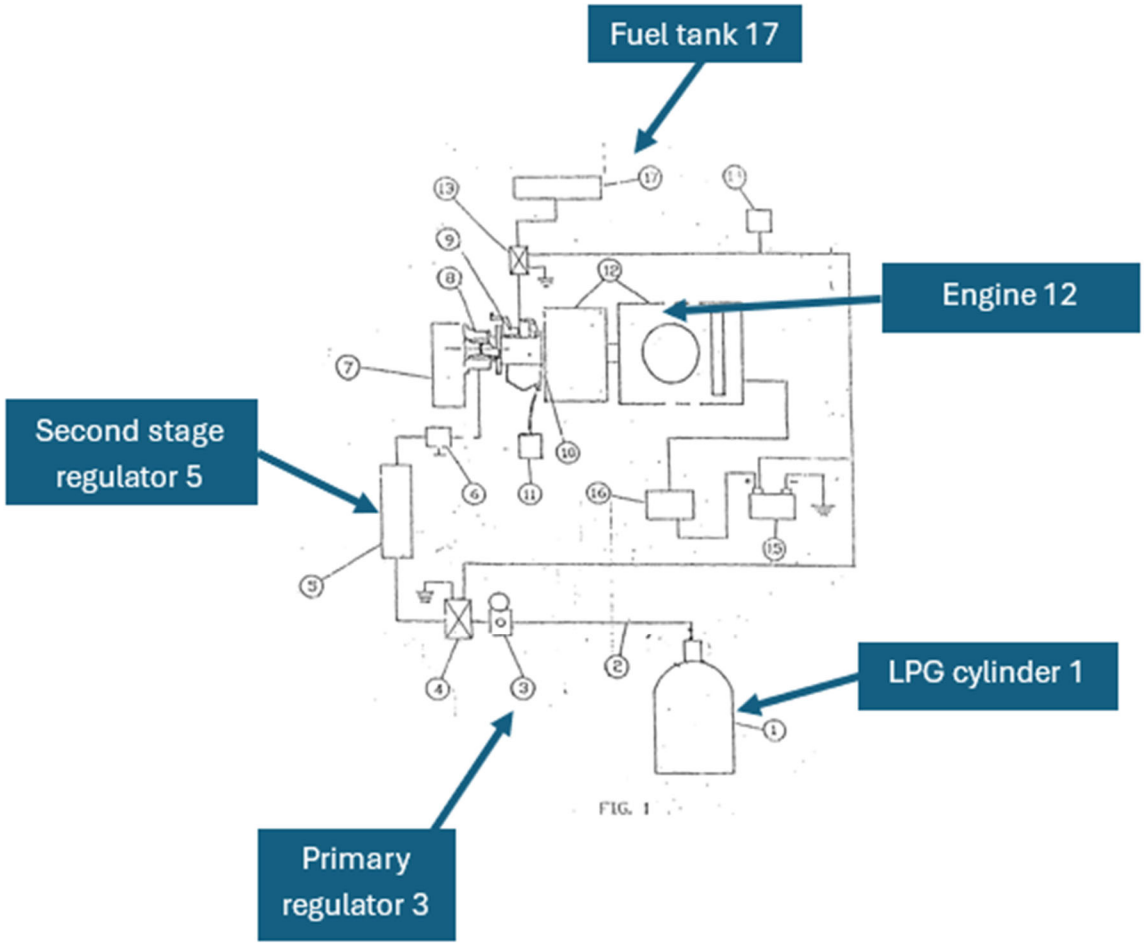
1. Claim 1

a. Element [1.0]

Chaudhari discloses a LPG fuel delivery system for use with a generator: "the present invention relates to a system for supplying Liquefied Petroleum Gas

(LPG) to bi-fuel stationary engines in response to the load and speed of the engine, such engines preferably being coupled to a portable generator." EX1008, 4.

Chaudhari describes using this LPG supply system with a generator that runs on gasoline or kerosene stored in a tank 17. *Id.*, 7, Fig. 1. Therefore, Chaudhari discloses a dual-fuel generator, configured to alternatively run on LPG and gasoline or kerosene. *Id.*

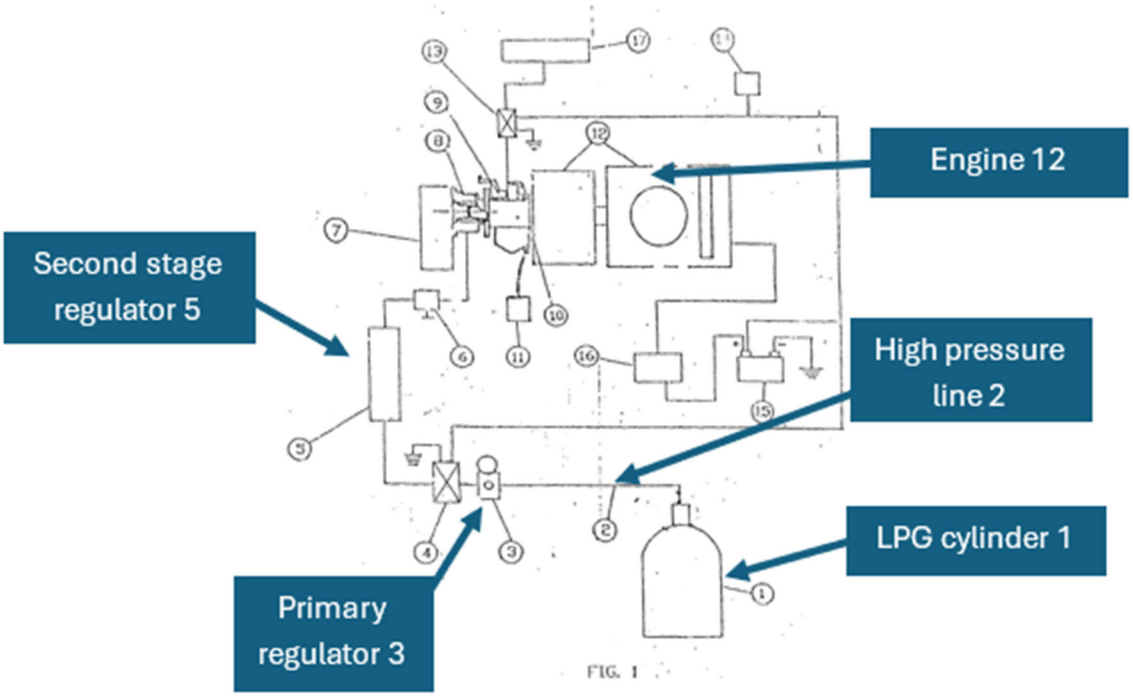


Id., Fig. 1 (annotated).

b. Element [1.1]

Chaudhari discloses an improved "Add-On" fuel supply system for use with an existing generator. *Id.*, 4-5. Chaudhari does not disclose a regulator on-board the generator, which is logical because the generator (without the add-on) operates on kerosene or gasoline, which do not require a pressure regulator. *Id.*, 7; EX1003, ¶238. The only regulators disclosed in Chaudhari are part of the "Add-On" fuel supply system, which is separate from the generator. EX1008, 7-8, Fig. 1.

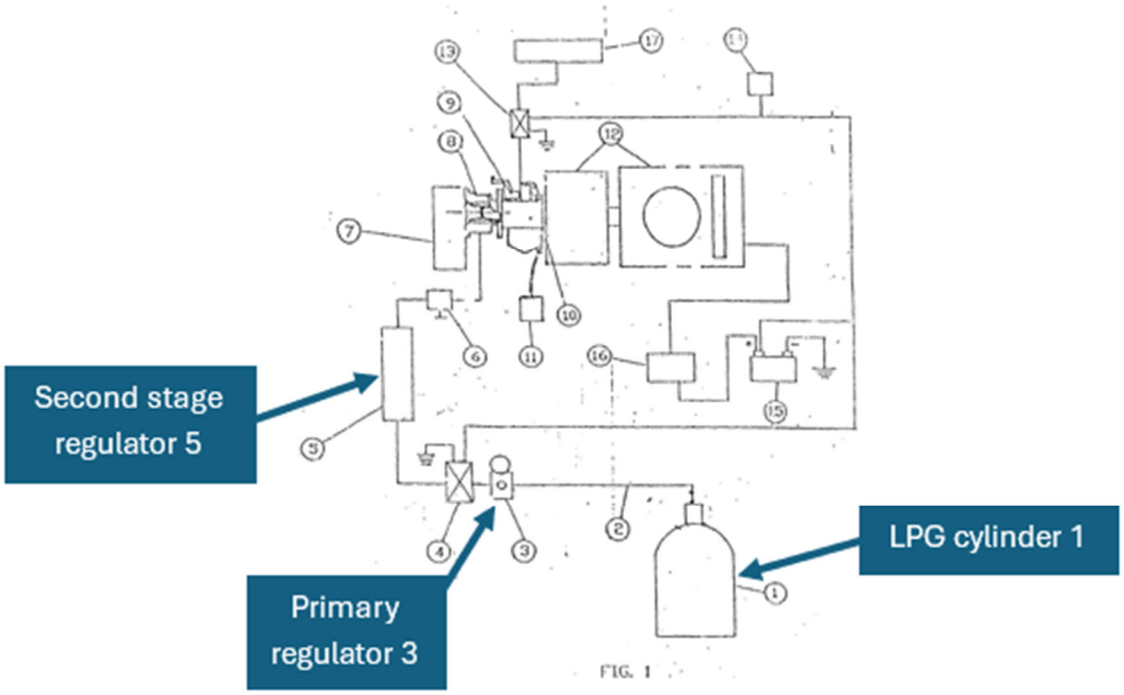
Chaudhari discloses the engine 12 of the generator is configured to operate on a gaseous fuel (LPG) supplied from a pressurized fuel source (LPG cylinder) when connected to the fuel supply system. *Id.* The LPG is supplied through a gaseous fuel line, including high pressure line 2. *Id.* It is inherent that the LPG source is pressurized because: (1) LPG cylinders are pressurized, as acknowledged in claim 1 requiring "a fuel cylinder for storing a predetermined quantity of Liquefied Petroleum Gas under pressure," and (2) Chaudhari discloses the use of pressure regulators and a high-pressure line to reduce the pressure of LPG from the cylinder. *Id.*; EX1003, ¶239.



EX1008, Fig. 1 (annotated).

c. Element [1.2]

Chaudhari discloses a fuel regulator system located off-board the generator. *Id.*, 4-5 (describing the fuel delivery system as an improved "Add-On" system), Fig. 1; EX1003, ¶240. Chaudhari discloses a first stage regulator 3 and second stage regulator 5. *Id.*, 7-8, Fig. 1.



Id., Fig. 1 (annotated).

d. Element [1.3]

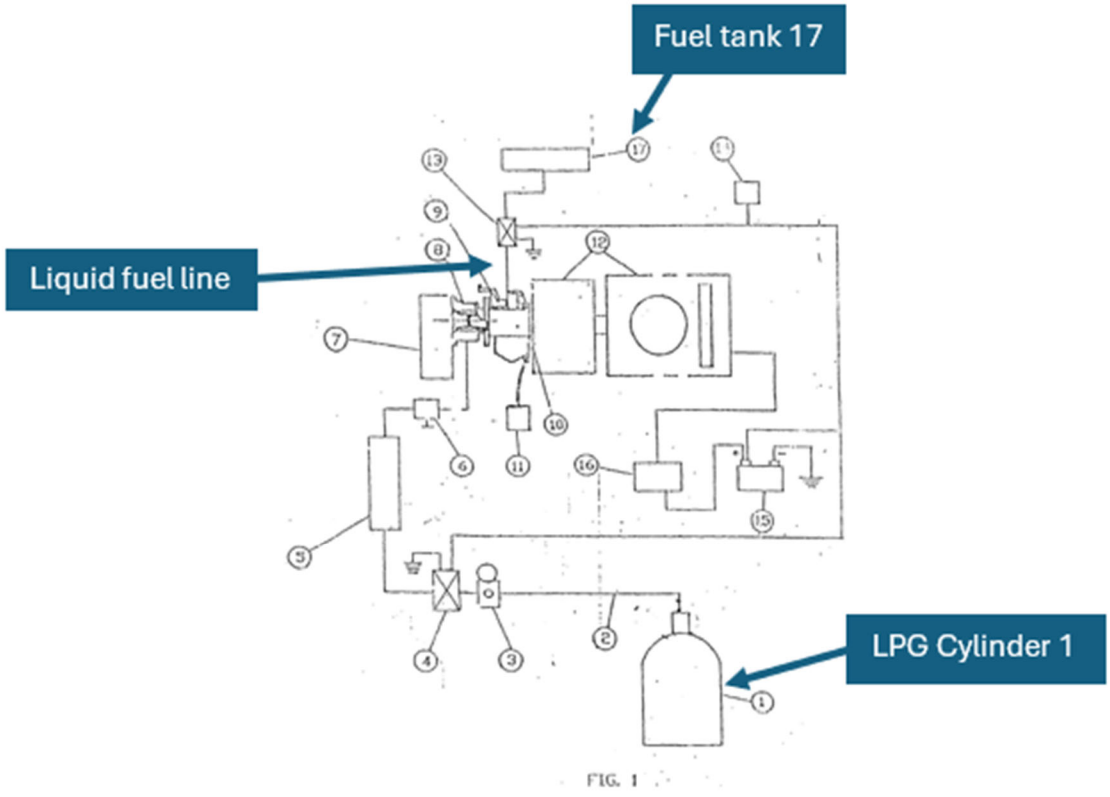
Chaudhari discloses the first stage regulator 3 regulates LPG supplied from the LPG cylinder to a reduced pressure. *Id.*, 7, Fig. 1.

e. Element [1.4]

Chaudhari discloses the second stage regulator 5 regulates LPG from the first stage regulator 3 down to a desired pressure for supply through the gaseous fuel line (the line connecting the second stage regulator to the engine) to operate the generator. *Id.*, 7, Fig. 1; EX1003, ¶242.

2. Claim 4

Chaudhari discloses a generator that operates on liquid fuel (kerosene or gasoline) that is configured to also operate on gaseous fuel (LPG). *Id.*, 7-8. The liquid fuel is supplied from a tank 17 through a liquid fuel line. *Id.*, 7, Fig. 1.



Id., Fig. 1 (annotated).

3. Claim 11

a. Element [11.0]

As discussed, Chaudhari this element. *Supra* §VII.E.1.a.

b. Element [11.1]

Chaudhari discloses this element, including a generator comprising an engine. *Supra* §VII.E.1.b; EX1008, 7-8, Fig. 1.

c. Element [11.2]

As discussed, Chaudhari discloses this element. *Supra* §VII.E.1.c.

d. Element [11.3]

As discussed, Chaudhari discloses this element. *Supra* §VII.E.1.d.

e. Element [11.4]

As discussed, Chaudhari discloses this element. *Supra* §VII.E.1.e.

f. Element [11.5]

Chaudhari discloses the fuel regulator system outputs the gaseous LPG to the generator for operation of the engine at the second reduced pressure. EX1008, 6-7; EX1003, ¶249. Chaudhari discloses the second stage regulator (5) is

> connected to the inlet of a power screw (6). The outlet of the power screw (6) is connected to the inlet of a gas-air mixer (8). The gas-air mixer (8) supplies air-fuel mixture through a carburetor (9) to an engine (12) coupled to a generator.

Id., 7; *see also id.*, Fig. 1.

4. Claim 14

As discussed, Chaudhari discloses the elements of this claim. *Supra* §VII.E.2.

5. Claim 16

a. Element [16.0]

As discussed, Chaudhari discloses this element, including a dual-fuel generator. *Supra* §VII.E.1.a.

b. Element [16.1]

As discussed, Chaudhari discloses a dual-fuel generator configured to operate on the gaseous fuel (LPG) supplied from a pressurized fuel source (LPG cylinder) through a gaseous fuel line and on a liquid fuel (gasoline or kerosene) supplied from a liquid fuel source (tank 17) through a liquid fuel line. *Supra* §§VII.E.1.b, VII.E.2.

c. Element [16.2]

As discussed, Chaudhari discloses this element. *Supra* §VII.E.1.c.

d. Element [16.3]

Chaudhari discloses this element, including coupling the primary pressure regulator to a service valve of the LPG tank. *Supra* §VII.E.1.d; EX1008, 7. Chaudhari discloses the primary regulator is coupled to a service valve, which is a needle valve mounted on the LPG cylinder 1. EX1008, 7; EX1003, ¶254.

e. Element [16.4]

As discussed, Chaudhari discloses this element. *Supra* §VII.E.1.e.

f. Element [16.5]

As discussed, Chaudhari discloses this element. *Supra* §VII.E.3.f.

F. Ground 6: Claims 4, 14, and 16-19 are obvious over Parlatore in view of Chaudhari and LP-Gas Handbook

Claims 4, 14, and 16-19 of the '985 Patent are obvious under §103, as detailed below and in the declaration of Dr. Morse. EX1003, ¶¶257-277.

1. Claim 4

As discussed, Parlatore discloses the elements of claim 1. *Supra* §VII.A.1.

It would have been obvious to a POSA to use Parlatore's fuel delivery system with a dual-fuel generator, as suggested by Chaudhari. *Supra* §§VII.E.1.a-VII.E.1.b.

As discussed, Chaudhari discloses a dual-fuel engine coupled to a generator and configured to operate on gaseous fuel and liquid fuel. *Supra* §VII.E.2. Chaudhari's liquid fuel is supplied from a tank 17 through a liquid fuel line. *Id.*, 5, Fig. 1.

a. Motivation/Expectation of Success

Given the benefits of alternative fuels, such as lower emissions (e.g., it was and is well known that propane burns much cleaner, producing less emissions, than gasoline), a POSA would have been motivated to use a dual-fuel generator (as opposed to single-fuel generator), to provide the user with the option of alternatively using gasoline or LPG to generate electricity. EX1003, ¶261.

Multi-fuel generators, such as Chaudhari's, were recognized as especially useful because, for example, in certain power outages (such as major storms), the

user may not have access to gasoline if the gasoline stations are out of service. *Id.*, ¶262. Alternatively, the user may not have LPG on hand, but may have gasoline on hand for other uses, making it a readily available fuel source. *Id.* Enabling the option of using gasoline or LPG makes the generator more versatile. *Id.*

A POSA would have had a reasonable expectation of success in using Parlatore's fuel regulator system with the dual-fuel engine in Chaudhari because using the fuel regulator system to deliver gaseous LPG to the LPG line of a dual-fuel engine would be no different than delivering gaseous LPG to the LPG line of a single-fuel engine, as taught by Parlatore. EX1003, ¶263; EX1010, ¶¶[16]-[21], Figs. 1-3. The dual-stage regulator, which reduces high-pressure fuel to a usable level in two steps, performs this core function effectively in both single-fuel and dual-fuel engines. EX1003, ¶263.

2. Claim 14

As discussed, Chaudhari discloses a dual-fuel engine coupled to a generator configured to operate on a gaseous fuel (LPG) and on a liquid fuel (gasoline or kerosene) supplied from a liquid fuel source (tank 17) through a liquid fuel line. *Supra* §VII.F.1.

3. Claim 16

a. Element [16.0]

As discussed, Chaudhari discloses a dual-fuel engine coupled to a generator and fuel delivery system. *Supra* §VII.E.1.a.

b. Element [16.1]

As discussed, Chaudhari discloses a dual-fuel engine coupled to a generator configured to operate on the gaseous fuel (LPG) and on a liquid fuel (gasoline or kerosene) supplied from a liquid fuel source (tank 17) through a liquid fuel line. *Supra* §§VII.E.1.b, VII.E.2.

c. Element [16.2]

As discussed, Parlatore discloses a fuel regulator system located off-board a generator or, alternatively, it would have been obvious to a POSA to use Parlatore's off-board configuration with a generator. *Supra* §VII.A.1.c. It would have been obvious to a POSA to use Parlatore's off-board configuration with a dual-fuel generator for the same reasons discussed with respect to a single-fuel generator. *Id.*; EX1003, ¶267.

d. Element [16.3]

As discussed, Parlatore discloses a primary pressure regulator configured to regulate fuel from a pressurized fuel source (tank) to a first reduced pressure. *Supra* §VII.A.1.d. Parlatore discloses a connector 302 for coupling the primary pressure regulator to a service valve (shut off valve 316) of a propane tank. EX1010, ¶[0023], Fig. 3.

e. Element [16.4]

As discussed, Parlatore discloses a secondary pressure regulator coupled to the primary pressure regulator and configured to regulate the gaseous fuel supplied

from the primary pressure regulator down from the first reduced pressure to a second reduced pressure for delivery through the gaseous fuel line to operate an engine, including a generator when combined with Chaudhari (which discloses a dual-fuel generator). *Supra* §VII.A.1.e.

f. Element [16.5]

As discussed, the secondary regulator of Parlatore outputs gaseous fuel to a generator for operation at the second reduced pressure. *Supra* §VII.A.4.f. Combined with Chaudhari, Parlatore would output gaseous fuel to the Chaudhari dual-fuel generator for operation at the second reduced pressure. *Id.*; EX1003, ¶271.

4. Claim 17

As discussed, Parlatore discloses its primary and secondary pressure regulators can be a combined into a two-stage regulator 202. *Supra* §VII.A.2.

5. Claim 18

As discussed, it would have been obvious to use a quick connector at the end of the Parlatore hose as coupling 314. *Supra* §VII.B.1.b.

When using a quick connector as the coupling 314 of Parlatore, a first end would be coupled to the outlet of the secondary regulator 308 and a second end would be coupled to an inlet of the gaseous fuel line of the engine to couple the secondary pressure regulator to the gaseous fuel line of the appliance (e.g., a dual-fuel generator, as suggested by Chaudhari). *Id.*

6. Claim 19

As discussed, Parlatore discloses a mounting device for the secondary regulator secured to the collar of the LPG tank. *Supra* §VII.B.4. Parlatore also discloses the primary and secondary regulators can be combined as a single, two-stage regulator 202. *Id.* As discussed, using the same mounting arrangement from Figure 3 with Parlatore's combined regulator 202 and tank, the combined regulator would also be mounted on the mounting device. *Id.*

Alternatively, as discussed, this configuration would have been obvious. §VII.A.3.

In this configuration, the primary and secondary pressure regulators would be positioned adjacent each other along an outer periphery of the collar. *Supra* §VII.B.4.

G. Ground 7: Claims 4-6 and 14-15 are obvious over Parlatore in view of DuroMax and Elsdon

Claims 4-6 and 14-15 of the '985 Patent are obvious under §103, as detailed below and in the declaration of Dr. Morse. EX1003, ¶¶278-308.

1. Claim 4

As discussed, Parlatore discloses each and every element of claim 1 or renders it obvious. *Supra* §§VII.A.1.a-VII.A.1.e.

As discussed, it would have been obvious to use Parlatore's fuel regulator system with a dual-fuel generator. *Supra* §VII.F.1. For those same reasons, it

would have been obvious to use Parlatore's fuel regulator system with the DuroMax dual-fuel generator. EX1003, ¶280.

DuroMax discloses a dual-fuel generator that operates on either LPG or gasoline. EX1004, 11-12.

DuroMax discloses the liquid fuel (gasoline) is supplied from a liquid fuel source (tank) through a liquid fuel line. *Id.*, 9, 20-21, 30-31 (parts diagram/list depicting liquid fuel line as "PartNo. 137, Outlet Pipe").

Step 2 - Add Gasoline

⚠ **WARNING: Gasoline and gas fumes are highly flammable.**

- **Do not fill tank near an open flame.**
- **Do not overfill. Always check for fuel spills.**

To ensure that the generator runs smoothly use only FRESH, UNLEADED GAS WITH AN OCTANE RATING OF 87 OR HIGHER.

To add gasoline:

1. Make sure the generator is on a level surface.
2. Unscrew gas cap and set aside (NOTE: the gas cap may be tight and hard to unscrew).
3. Slowly add unleaded gasoline to the fuel tank. Be careful not to overfill. Please refer to the chart in *figure 4* to find the gas capacity of your generator model. The fuel gauge on the top of the gas tank indicates how much gasoline is in the generator gas tank. **NOTE: Gas can expand. Do not fill the gas tank to the very top.**
4. Replace fuel cap and wipe up any spilled gasoline with a dry cloth.

EX1004, 9.

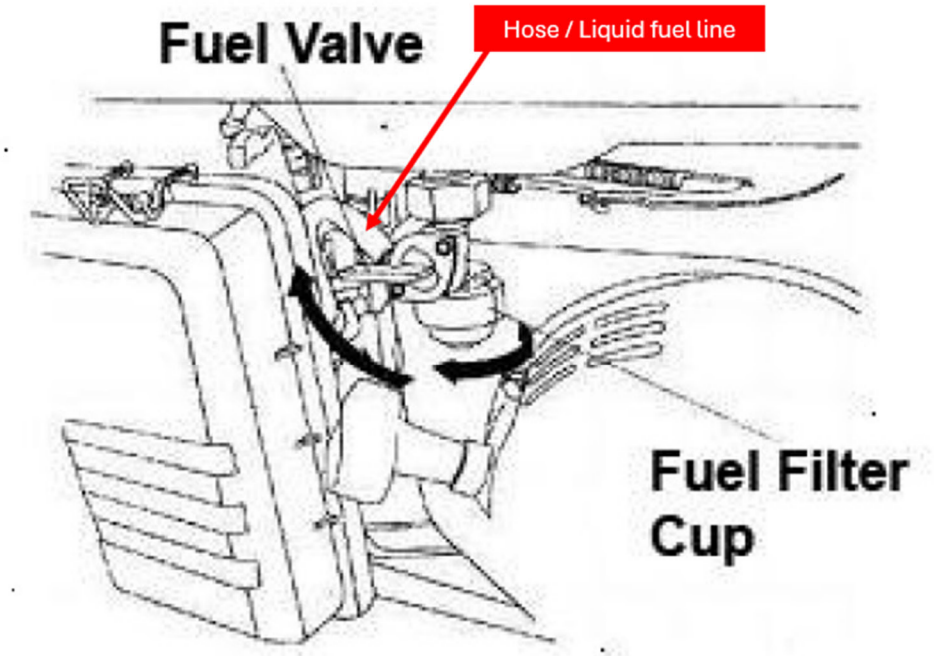


Figure 19 –Removing the Fuel Filter Cup

EX1004, 20 (annotated).

DuroMax's generator had one pressure regulator off-board (attached to the off-board hose, as show in Figure C) and one pressure regulator on-board (attached to the generator, as indicated in step 4/Figure B):

To start your generator with LPG, perform the following steps:

1. Make sure no electrical devices are connected to the generator.
2. Check that the generator is properly grounded (see page 13, "*Ground the Generator*").
3. Turn the gasoline fuel valve to the "OFF" position (see *figure 6*).
4. Connect the propane gas hose to the regulator (see figure B).
5. Connect the regulator to the liquid propane gas supply and then turn on the liquid propane gas supply, making sure there are no leaks (see figure C).
6. Open the clasp connected to the Pressure Release Valve (see figure C).
7. Press the button on Pressure Release Valve two to three times before starting the engine. (see figure D)
8. When starting the engine:
   a. If the engine is warm (The unit was run recently) start with the choke half open.
      i. Wait another 30 seconds and then move the choke lever all the way to the "OPEN" position.
   b. If the engine is cold (The unit has not been run for half an hour or more) start with the choke open. (see figure E & F).
9. Pull on the recoil starter handle slowly until a slight resistance is felt (see *figure 8*). Then pull quickly to start the engine. Return cord gently into the machine. Never allow the cord to snap back.
10. Allow the generator to run for several minutes before attempting to connect any electrical devices.

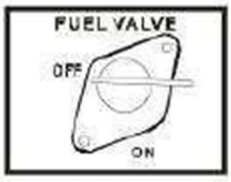


Figure A - Fuel Valve in the "OFF" position



Figure B - Connect the Hose



Figure C-Connect Valve

EX1004, 12; EX1003, ¶282.

A POSA would have found it obvious to use an off-board regulator system with both regulators off-board, such as the off-board configuration depicted in Parlatore's Figure 3, with DuroMax's generator. EX1003, ¶283.

a. Motivation/Expectation of Success

One reason to locate the fuel delivery regulators off-board from the generator and near or at the LPG tank is so that the fuel line leading to the engine will already be at the relatively lower pressure set by the output of the secondary regulator. EX1003, ¶284. This enhances safety in case this fuel line is punctured or damaged in some way, since the fuel in this line will be at a lower pressure. *Id*. Additional benefits include improved access for servicing and more stable operating conditions (i.e., less exposure to heat and vibrations created by the generator, both of which can prematurely wear the regulator components). *Id.*

It would have been obvious to a POSA to use the off-board fuel regulator system disclosed in Parlatore because Parlatore discloses the use of a regulator system with "any desired form of engine" and specifically suggests the use of its regulator system with generators. EX1010, ¶¶[0019] & [0025]; *see also id.*, ¶[0024] (suggesting off-board configuration "where more fuel may be desired"); Ex. 1003, ¶285.

Parlatore shows that a POSA would have had a reasonable expectation of success using an off-board fuel regulator system. EX1010, ¶¶[0019]-[0021], [0024]-[0025], Fig. 3; EX1003, ¶286.

2. Claim 5

DuroMax discloses a mechanical fuel valve coupled to the internal combustion engine:

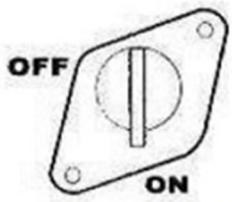


Figure 6 - fuel valve in the "on" position

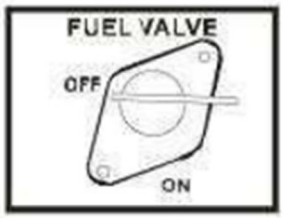


Figure A - Fuel Valve in the "OFF" position

EX1004, 11-12.

Elsdon discloses a fuel conduit coupler 12 shield 14 and cap 16 that, when closed, prevents connection of a fuel source. EX1005, 3:3-14. Elsdon discloses that by rotating cap 16 over conduit coupler 12, cap 16 prohibits access to the coupler interface, thereby preventing connecting of a hose with the coupler interface. *Id.*, 3:3-14, 5:1-10.

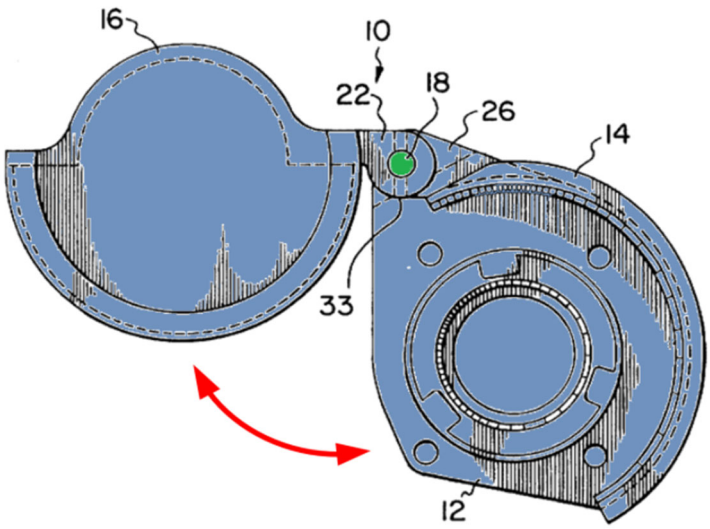


FIG. 1

Id., Fig. 1 (annotated).

It would have been obvious to a POSA to combine the Elsdon fuel conduit coupler cap with DuroMax's gasoline fuel valve to provide a mechanical fuel valve that both controls the flow of gasoline from the tank through the gasoline line (as disclosed by DuroMax) and simultaneously rotates to block and unblock the LPG inlet of the DuroMax generator (as disclosed by Elsdon). EX1003, ¶290. By blocking and unblocking the LPG inlet, this combined apparatus would selectively control the flow of LPG through the LPG fuel line. *Id.* This combination would appear and function the same way as Figures 2-4B of the '985 Patent. *Id.*

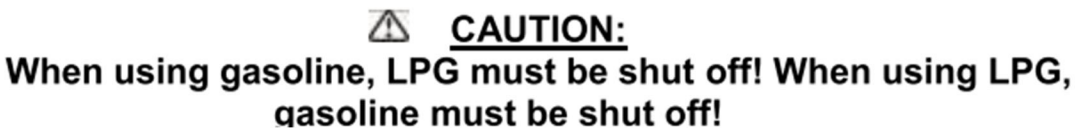
a. Motivation to Combine

A POSA would been motivated to implement the fuel conduit coupler cap assembly of Elsdon to selectively cover and uncover the LPG fuel conduit coupler of DuroMax. EX1003, ¶291. Specifically, a POSA would have been motivated to

connect the Elsdon fuel conduit coupler cap to the mechanical fuel valve of DuroMax to restrict access to the LPG hose connector interface of DuroMax when the DuroMax generator is operating on gasoline. *Id.*

A POSA would have understood that by implementing the Elsdon fuel conduit coupler cap assembly in this way, one could link the opening and closing of the DuroMax mechanical fuel valve with the covering and uncovering of the LPG fuel conduit coupler. *Id.*, ¶292. A POSA would have understood such an arrangement to prevent simultaneous use of LPG and gasoline, which was a known problem to avoid with generators such as DuroMax. EX1004, 11; EX1001, 1:56-67; EX1003, ¶292.

A POSA would understand that while DuroMax can run on either gasoline fuel or LPG fuel, DuroMax is not configured to run on both fuel sources at the same time. EX1003, ¶293. For example, DuroMax provides the following warning label:



EX1004, 11.

Elsdon explicitly discloses the importance of properly sequencing the connection of fuel sources with the opening of associated valves. For example, Elsdon notes that it may be important to ensure the closing or opening of fuel

valves before permitting coupling or uncoupling to the connection interface. EX1005, 1:23-40. Elsdon discloses that its cap and shield may be utilized in such sequenced interconnected valve and coupler arrangements. *Id.*, 4:44-53.

In addition, a POSA would have been motivated to make this combination to ensure the inlet is automatically shielded when not connected, to prevent debris from entering the LPG fuel inlet of the DuroMax generator. EX1003, ¶295. Elsdon specifically teaches this motivation: "It is an object of the present invention to provide a cap and shield assembly to protect a fluid conduit coupler from debris." EX1005, 2:7-9.

b. Expectation of Success

A POSA would have had a reasonable expectation of success in implementing the fuel conduit coupler cap of Elsdon onto the LPG fuel conduit coupler of DuroMax. EX1003, ¶296. Elsdon emphasizes that its cap assembly may be "retrofit" to cover existing fuel couplers on "construction equipment" such as a generator. EX1005, 2:10-12, 2:27-31, 5:11-14. Elsdon utilizes a simple connection arrangement, in which cap 16 rotates around the axis of the shaft 18:

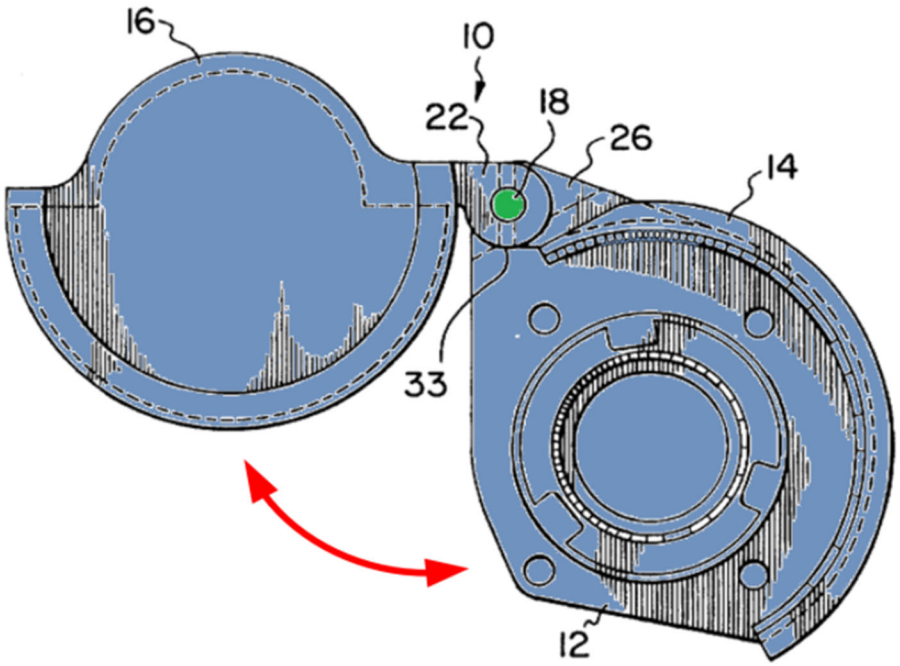


FIG. 1

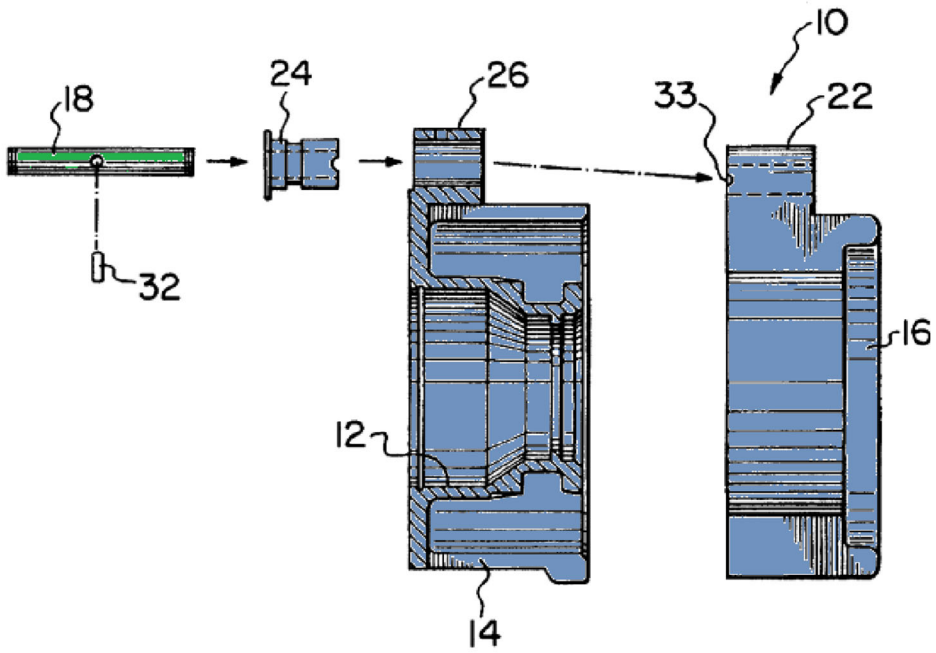


FIG. 3

EX1005, Figs. 1, 3 (annotated).

A POSA would have understood that the fuel valve of DuroMax is a simple mechanical fuel valve utilizing a valve handle that rotates a shaft connected to a stop inside of the valve body for preventing fuel flow. EX1004, 11-12; EX1003, ¶297.

A POSA would have understood that the valve handle and shaft of the DuroMax fuel valve could be readily connected to cap 16 of Elsdon such that the DuroMax valve handle and shaft rotate together with Elsdon cap 16. EX1003, ¶298.

A POSA would have further understood that the fuel valve and LPG fuel conduit coupler of DuroMax could easily be moved to different positions on the generator such that the two components are located immediately next to each other. EX1003, ¶299; *see also* EX1013, 15:39-16:20 (discussing how the position of the LPG regulator, and therefore the inlet connector on a portable generator can be easily moved to different locations). In that case, cap 16 of Elsdon would rotate with the valve handle of the DuroMax fuel valve to cover the LPG fuel conduit coupler when the DuroMax fuel valve is open, and could rotate to permit access to the LPG fuel conduit coupler when the DuroMax fuel valve is closed. EX1003, ¶299.

3. Claim 6

a. Element [6.1]

The term "fuel lockout apparatus" is properly construed as a means-plus-function term covering items 58 and 61 in Figs. 2, 3, 4A, 4B, as described at EX1001, 5:50-6:10; 6:24-45; 6:56-7:31; 8:1-14; 8:63-9:11, and equivalents thereof. *Supra* §V.A.

As discussed, it would have been obvious to connect the valve handle and shaft of the DuroMax fuel valve to cap 16 of Elsdon, which would have resulted in a flange that is rigidly coupled to a fuel valve handle, with the flange extending radially from the fuel valve handle so that the flange rotates with the fuel valve handle and rotates transversely over the fuel inlet for LPG between a first position in which the flange blocks access to the fuel inlet for the LPG when the fuel valve handle is in position to allow gasoline to run the engine, and between a second position in which the flange does not block the fuel inlet for the LPG when the fuel valve handle is in position to restrict gasoline from running the engine. *Supra* §VII.G.2.

b. Element [6.2][4]

The DuroMax mechanical fuel valve rotates between a first position in which the valve is opened (communicating the gasoline fuel source to the dual-fuel engine) and a second position in which the valve is closed (interrupting communication of the gasoline fuel source to the dual-fuel engine). It would have been obvious to connect the valve handle and shaft of the DuroMax fuel valve to cap 16 of Elsdon to prevent the simultanious flow of gasoline and LPG fuel to the dual-fuel engine. *Supra* §VII.G.2.

Specifically, it would have been obvious to connect these components so that cap 16 covers the LPG fuel conduit coupler when the mechanical fuel valve is in the open (first) position (preventing communication between the LPG fuel source and the dual-fuel engine) and to uncover the LPG fuel conduit coupler (communicating the second fuel source to the dual-fuel engine) when the mechanical fuel valve is in the closed (second) position. *Supra* §VII.G.2.

[4] While claim 6 discusses the "fuel lockout apparatus [communicating] the first fuel source" and "interrupting first fuel source communication," the disclosure of the '985 Patent associates this functionality with the mechanical fuel valve assembly. While claim 6 appears to be invalid under §112 as a result, to the extent it is construed to cover the structure disclosed in FIGS. 2-4B of the '985 Patent, it is invalid over DuroMax and Elsdon, the combination of which discloses the same structure.

4. Claim 14

As discussed, Parlatore discloses each and every element of claim 11 (*supra* §§VII.A.1.a-VII.A.1.e, VII.A.4.a-VII.A.4.f.) and the obvious combination of Parlatore and DuroMax discloses the additional elements of claim 14 (*supra* §§VII.D.1, VII.G.1).

5. Claim 15

As discussed, the obvious combination of Parlatore, DuroMax, and Elsdon discloses the elements of this claim. *Supra* §VII.G.2.

H. Ground 8: Claims 4-6 and 14-15 are obvious over Parlatore in view of Hallberg

Claims 4-6 and 14-15 of the '985 Patent are obvious under §103, as detailed below and in the declaration of Dr. Morse. EX1003, ¶¶309-338.

Under Patent Owner's proposed constructions, claim 6 of the '985 Patent is also obvious over Parlatore in view of Hallberg under §103, as detailed below and in the declaration of Dr. Morse.

1. Claim 4

As discussed, Parlatore discloses each and every element of claim 1. *Supra* §§VII.A.1.a-VII.A.1.e.

Parlatore discloses using its fuel delivery system with "any desired form of engine," including an engine for generators. EX1010, ¶¶[0025], [0019]. As discussed, it would have been obvious to a POSA to use Parlatore's fuel regulator

system with a dual-fuel generator. *Supra* §VII.F.1. Hallberg discloses an example of a dual-fuel engine that could be used with a generator. EX1003, ¶312.

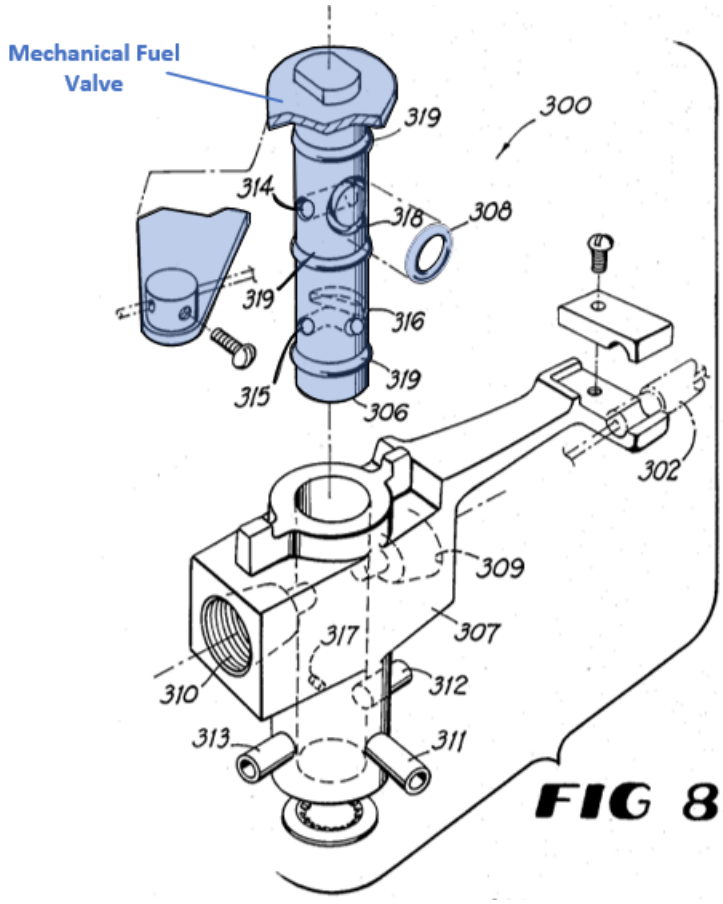
The engine of Hallberg is configured to operate on gaseous fuel (propane) and on a liquid fuel (gasoline). EX1006, 7:27-29, Fig. 1. Hallberg discloses that the liquid fuel is supplied from a liquid fuel source through a liquid fuel line. EX1006, 7:27-44, Fig. 1, Claim 17.

Hallberg discloses a LPG regulator system but does not indicate whether the regulator system is "off-board." EX1006, 6:65-7:8, 8:31-9:61. A POSA would have been motivated to use Parlatore's "off-board" regulator system shown in Figure 3 with a generator having Hallberg's dual-fuel engine. EX1003, ¶314.

As discussed, a POSA would have been motivated to use Parlatore's off-board regulator system for use with a generator and would have had a reasonable expectation of success. *Supra* §VII.A.1.c. This same reasoning applies to a dual-fuel generator, because a POSA would have recognized the user may have only LPG available at any given time, thus the user would want a large, off-board tank to run the generator for a sufficient period of time, such as a long outage due to a storm. EX1003, ¶315.

2. Claim 5

Hallberg discloses a mechanical fuel valve ("[i]n the figures…300 is the fluid dual valve structure"). EX1006, 7:5-7.



Id., Fig. 8 (annotated).

Positioning control 301 in "gasoline" mode acts through control cable 302 to rotate spool 306 within valve body 307 such that gasoline from gasoline supply line 304 is supplied to the carburetor 110 and the flow of propane is locked out. *Id.*, 7:27-40. When the mechanical fuel valve is in gasoline mode, liquid inlet opening 309 and liquid outlet opening 310 communicate through tunnel 314. EX1006, 7:40-7:43; Fig. 10. A POSA would have understood that the mechanical fuel valve is actuatable to a first position to selectively control fuel flow to the dual-fuel engine from a first fuel source through a first fuel line. EX1003, ¶317.

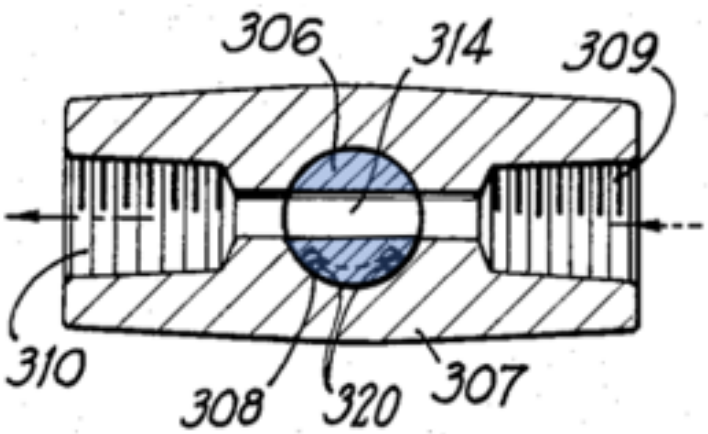
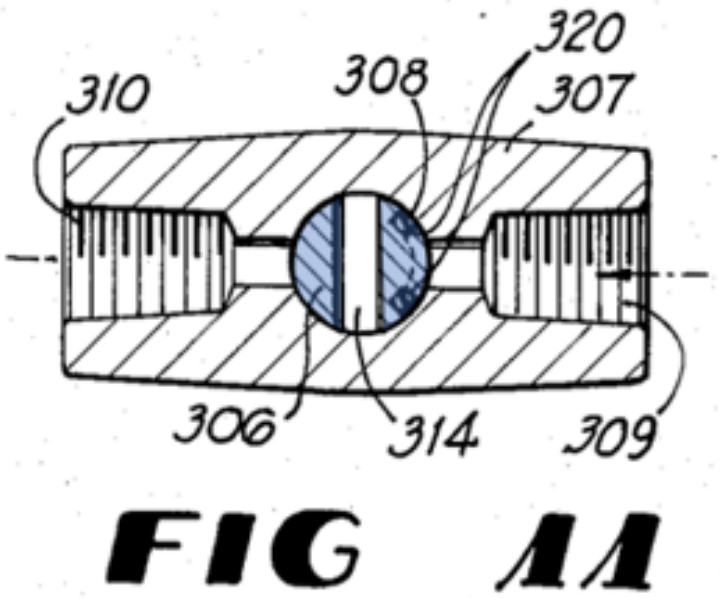


FIG 10

EX1006, Fig. 10 (annotated).

When "propane" mode of control 301 is selected, spool 306 is rotated within valve body 307 by control cable 302 such that O-ring 308 on the face of spool 306 forms a seal between spool 306 and valve body 307 around liquid inlet opening 309. *Id.*, 8:3-7; Fig. 11. Forming a seal between the spool 306 and valve body 307 prohibits the flow of gasoline to carburetor 110. *Id.*, 8:7-10.



Id., Fig. 11 (annotated).

During "propane" mode of operation, duct 315 within spool 306 is simultaneously aligned to communicate with vacuum inlet port 311 and first vacuum outlet port 312. *Id.*, 8:23-26, Fig. 13. Communicating vacuum inlet port 311 with the first vacuum outlet port 312 connects converter vacuum line 30 to the intake manifold, via intake manifold line 112. *Id.*, 8:26-30.

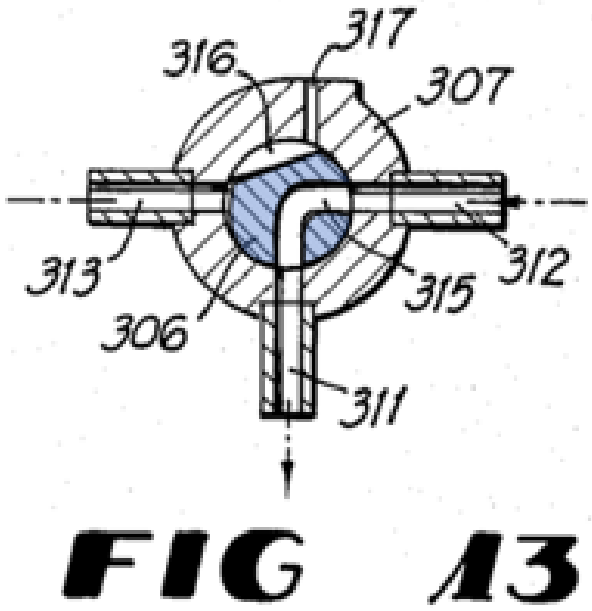


FIG 13

Id., Fig. 13 (annotated).

When the engine is started, a vacuum is created in line 30, urging diaphragm 10 upward against liquid inlet lever 8. *Id.*, 8:31-38. Actuating inlet lever 8 drives inlet valve shaft 41 against bias spring 3 which opens liquid inlet valve 2 allowing propane to flow through the propane fuel line to the engine. *Id.*, 8:38-42.

A POSA would have understood that Hallberg teaches a mechanical fuel valve actuatable between a first position (gasoline) and a second position (propane) to selectively control fuel flow to the dual-fuel engine from a first fuel source through a first fuel line and a second fuel source through a second fuel line as recited in claim 5. EX1003, ¶321.

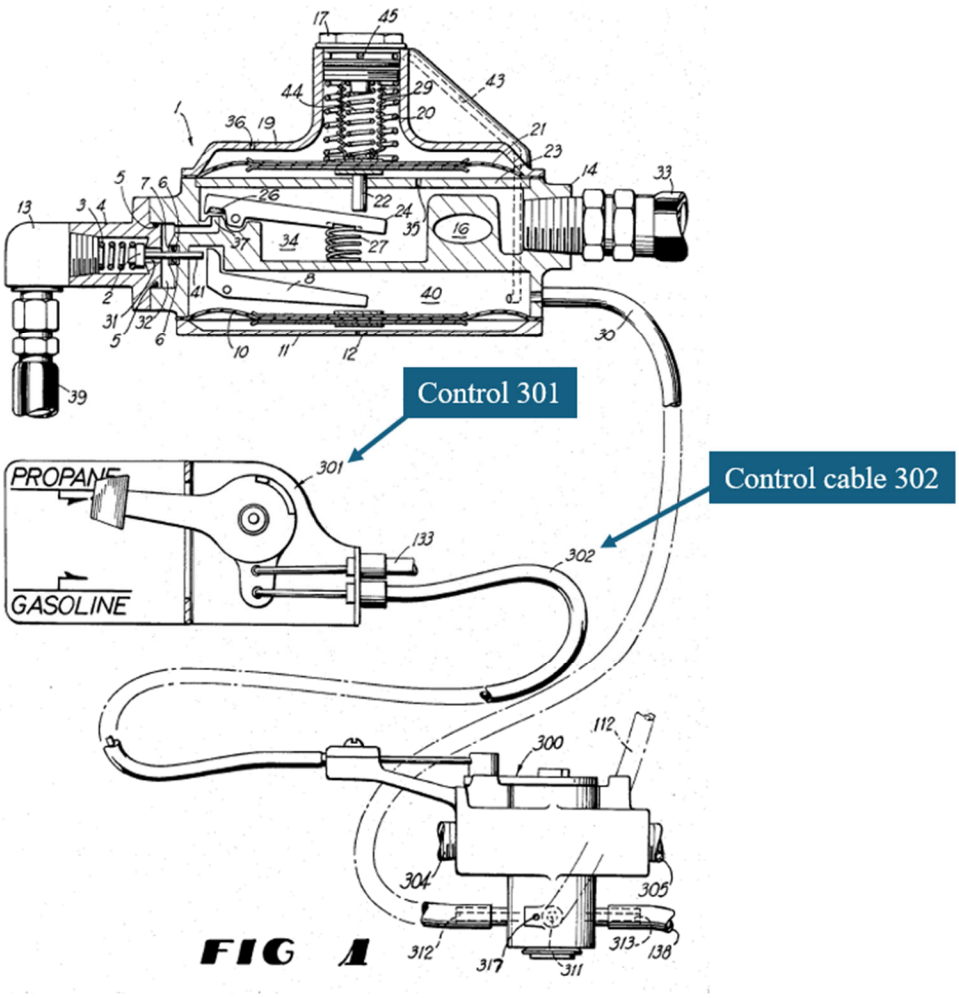
Combined with Parlatore, the mechanical fuel valve 300 of Hallberg would selectively control the flow of fuel to the dual-fuel generator (the Parlatore generator with the Hallberg dual-fuel engine). EX1003, ¶322.

3. Claim 6

a. Element [6.1]

As discussed, Hallberg discloses a mechanical fuel valve. *Supra* §VII.H.2. Hallberg also discloses two structures, each of which teaches a fuel lockout apparatus coupled to the mechanical fuel valve (fluid dual valve structure 300), the fuel lockout apparatus being configured to perform the function described in claim 6 (*infra* §VII.H.3.b).

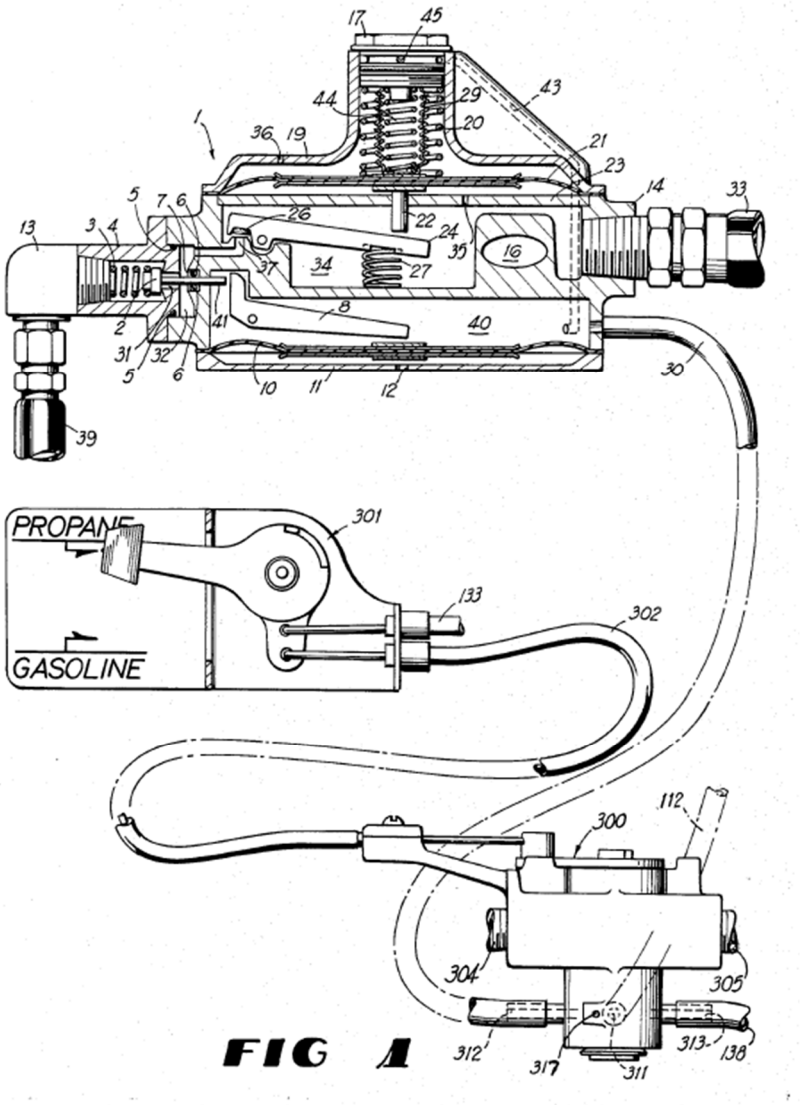
First, Hallberg discloses a fuel lockout apparatus comprising control 301 and control cable 302. EX1006, 7:27-44; EX1003, ¶325. The fuel lockout apparatus (comprising control 301 and control cable 302) is coupled to fluid dual valve 300. EX1006, 7:30-36, 8:3-9, Fig. 1. Positioning control 301 in the "gasoline" mode acts through control cable 302 to permit gasoline to flow through fluid dual valve 300, and to lock out propane from flowing to the dual-fuel engine. *Supra* §VII.H.2. Positioning control 301 in the "propane" mode acts through control cable 302 to permit propane to flow to the dual-fuel engine, and to lock out gasoline from flowing through fluid dual valve 300. *Id.*



EX1006, Fig. 1 (annotated).

Alternatively, Hallberg also discloses a fuel lockout apparatus comprising a liquified fuel inlet valve 2, lever 8, a fuel inlet shaft 41, a diaphragm 10, and a chamber 40. EX1003, ¶326; EX1006, 7:64-8:2. As shown in Figure 1, when in propane mode, vacuum from the engine intake urges diaphragm 10 upward against liquid inlet lever 8, the opposite end of which drives inlet valve shaft 41 against bias spring 3 and opens liquid inlet valve 2. EX1006, 8:23-40. Upon opening inlet

valve 2, propane flows through the inlet valve orifice 31 into liquified fuel passage 32 and into the mixer 100. *Id.*, 8:40-57.

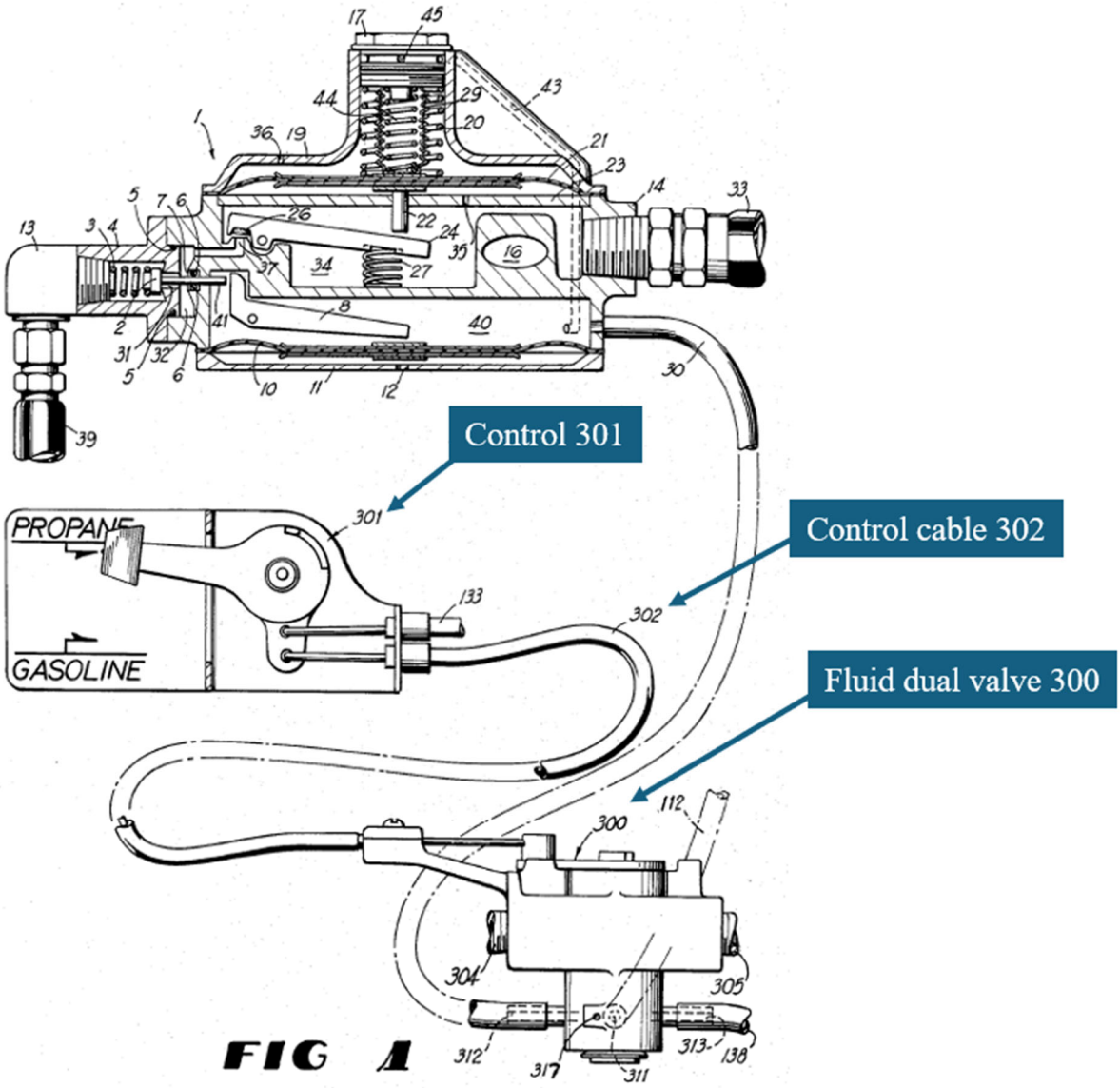


Id., Fig. 1.

A POSA would have understood that the components of the fuel lockout apparatus (liquified fuel inlet valve 2, lever 8, a fuel inlet shaft 41, a diaphragm 10, and a chamber 40) can be actuated and/or engaged to allow propane to flow through propane supply 39 to the internal combustion engine. EX1003, ¶327. A

POSA would have also understood that if the components of the fuel lockout apparatus are not actuated and/or engaged, propane is not supplied to the dual-fuel generator. *Id.*

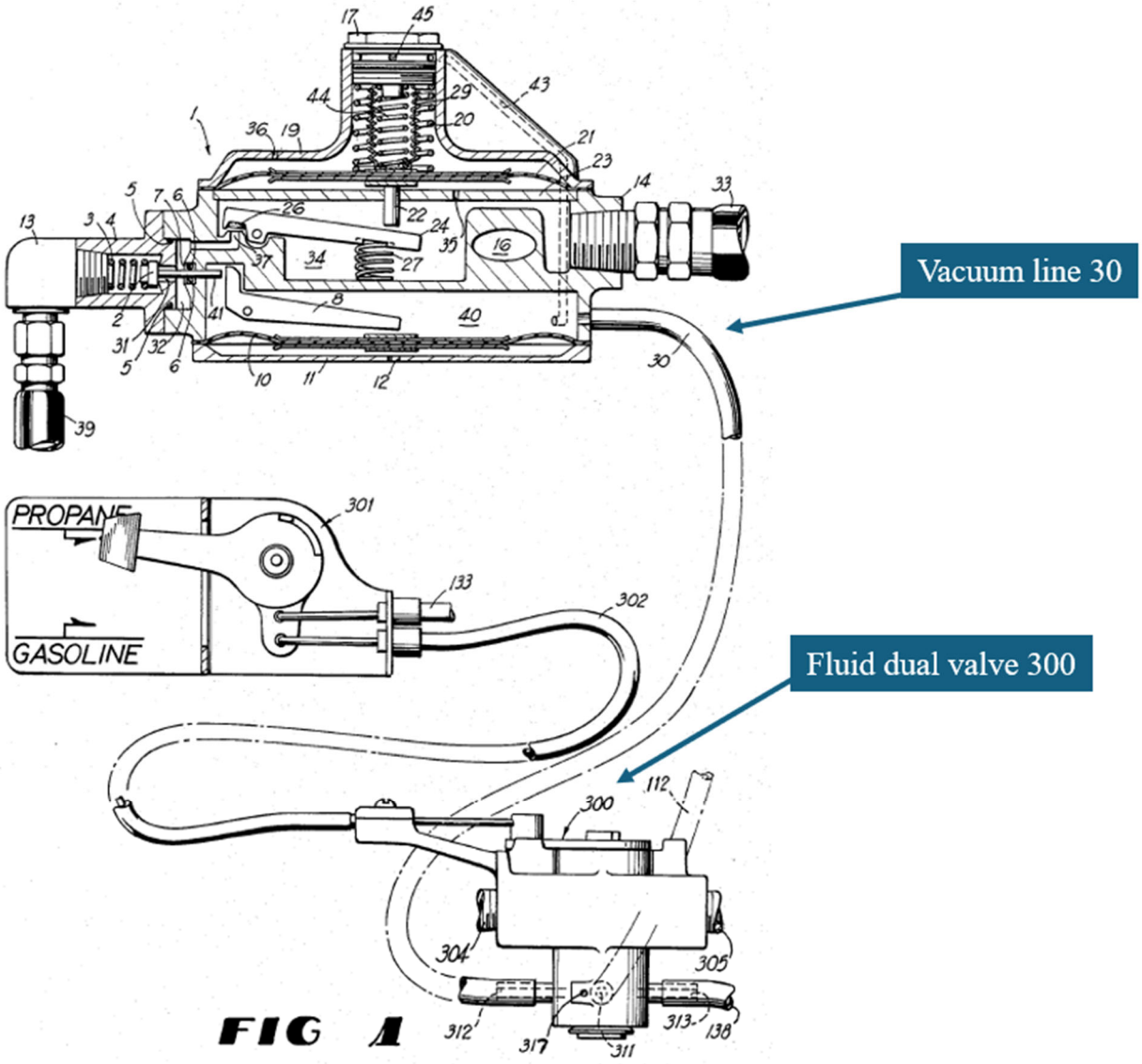
Hallberg also discloses that the fuel lockout apparatus is coupled to the mechanical fuel valve. EX1003, ¶328. As shown in Figure 1, control cable 302 couples the fuel lockout apparatus comprising control 301 and control cable 302 to the mechanical fuel valve. Without control cable 302, the control 301 would be unable to rotate spool 306 within the valve body 307. EX1006, 7:30-32.



Id., Fig. 1 (annotated).

Alternatively, as shown in Figure 1, vacuum line 30 couples the fuel lockout apparatus comprising liquified fuel inlet valve 2, lever 8, fuel inlet shaft 41, diaphragm 10, and chamber 40 to the mechanical fuel valve (fluid dual valve 300). Without vacuum line 30 receiving vacuum from vacuum outlet port 312, chamber

40 would be unable to actuate diaphragm 10, which engages lever 8, which drives inlet shaft 41 against bias spring 3 to open liquid inlet valve 2. *Id.*, 8:23-42.



Id., Fig. 1 (annotated).

b. Element [6.2]

Hallberg discloses that when gasoline using control 301, spool 306, within valve body 307, is rotated such that gasoline from gasoline supply line 304 is

supplied to the carburetor 110 through engine gasoline line 305. EX1006, 7:27-44. When gasoline is selected, gasoline is communicated through inlet opening 309, tunnel 314 and liquid outlet opening 310:

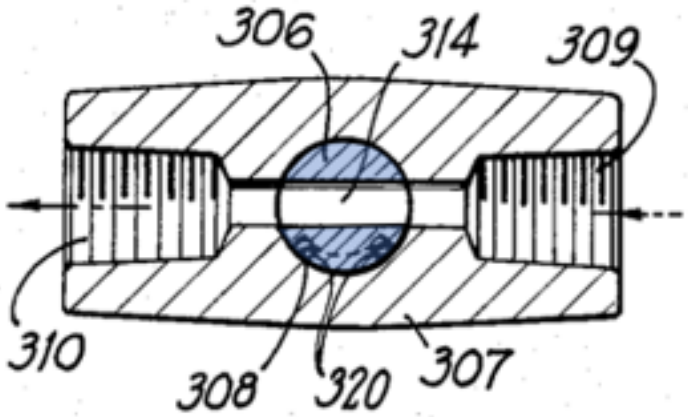


FIG 10

Id., Fig. 10 (annotated).

During gasoline mode, the fuel lockout apparatus prevents the flow of propane to the internal combustion engine. *Supra* §§VII.H.2-VII.H.3.a. A POSA would have understood that when the mechanical fuel valve is in the first position, the fuel lockout apparatus communicates the first fuel source to the dual-fuel engine and prevents communication between the second fuel source and the dual-fuel engine. EX1003, ¶331.

When propane mode is selected using control 301, propane is provided to the dual-fuel engine. EX1006, 8:3-30. As discussed (*supra* §§VII.H.2-VII.H.3.a), when propane mode is selected, spool 306 is rotated within valve body 307 to form

a seal to prevent the flow of gasoline to the engine and a vacuum is created in line 30, urging diaphragm 10 upward against liquid inlet lever 8 which drives inlet valve shaft 41 against bias spring 3 which opens liquid inlet valve 2 allowing propane to flow through the propane fuel line to the engine. A POSA would have understood when the mechanical fuel valve is in a second position, the fuel lockout apparatus communicates the second fuel source to the dual-fuel engine and interrupts the first fuel source communication with the dual-fuel engine. EX1003, ¶¶332-333.

4. Claim 14

As discussed, Parlatore discloses each and every element of claim 11 (*supra* §§VII.A.1.a-VII.A.1.e, VII.A.4.a-VII.A.4.f) and the obvious combination of Parlatore and Hallberg discloses the additional elements of claim 14 (*supra* §§VII.F.1, VII.H.1).

5. Claim 15

As discussed, the obvious combination of Parlatore and Hallberg discloses the elements of this claim. *Supra* §VII.H.2.

VIII. MANDATORY NOTICES AND FEES

A. Real Parties-In-Interest

In addition to Petitioners, Harbor Freight Holdings, Inc., Generac Holdings Inc., MWE Equipment Sales, LLC are listed as potential real-parties-in-interest.

B. Related Matters

The ’985 Patent is or has been involved in several pending litigations.

Patent Owner has asserted the ’985 Patent and related 10,221,780 (’780 Patent), 10,393,034 (’034 Patent), 10,697,398 (’398 Patent), 11,143,120 (’120 Patent), 11,143,145 (’145 Patent), 11,530,654 (’654 Patent), 11,840,970 (’970 Patent), and 11,905,895 (’895 Patent), as well as other non-family member patents, in *Champion Power Equipment Inc. v. Firman Power Equipment Inc.*, 23-cv-02371-DWL (D. Ariz.).

Patent Owner has asserted the ’985 Patent and related ’780 Patent, ’398 Patent, ’120 Patent, ’145 Patent, ’654 Patent, ’970 Patent, and ’895 Patent, as well as other non-family member patents, in *Champion Power Equipment Inc. v. Generac Power Systems Inc.*, 24-cv-01281-LA (E.D. Wis.).

Petitioner Harbor Freight has filed a declaratory judgment action alleging non-infringement of the ’985 Patent and related ’654 Patent, ’780 Patent, ’398 Patent, ’034 Patent, ’120 Patent, ’145 Patent, ’970 Patent, and ’895 Patent, as well as other non-family member patents, in *Harbor Freight Tools USA, Inc. v. Champion Power Equipment, Inc.*, 24-cv-08722-SVW-AS (C.D. Cal.).

Patent Owner has asserted the ’985 Patent and related ’780 Patent, ’398 Patent, ’034 Patent, ’120 Patent, ’145 Patent, ’654 Patent, ’970 Patent, and ’895 Patent, as well as other non-family member patents in *Champion Power Equipment*

Inc. v. Harbor Freight Tools USA Inc., 24-cv-01302-PP (E.D. Wis.). This case was dismissed on April 29, 2025, in favor of the earlier filed action in C.D. California cited above.

Patent Owner has asserted the ’985 Patent and related ’780 Patent, ’034 Patent, ’398 Patent, ’120 Patent, ’145 Patent, ’985 Patent, and ’895 Patent, as well as other non-family member patents, in *Champion Power Equipment Inc. v. Westinghouse Elec. Corp. et al.* in the United States District Court of Nevada, Civil Action No. 2:25-cv-00844.

C. Counsel and Service Information

Pursuant to 37 C.F.R. §42.8(b)(3) and 42.10(a), Petitioner provides the following counsel and service information. Pursuant to 37 C.F.R. §42.10(b), a Power of Attorney for each Petitioner accompanies this Petition.

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Petitioner consents to electronic service directed to the following email address:

HarborFreight-Champion-IPRs@foley.com

D. Payment of Fees

The Office is authorized to charge fees for this Petition to Deposit Account No. 190741. Any additional fees that might be due are also authorized.

IX. CONCLUSION

Trial should be instituted and the Challenged Claims cancelled.

CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITATION, TYPEFACE REQUIREMENTS, AND TYPE STYLE REQUIREMENTS

1. This Petition complies with the type-volume limitation of 14,000 words, comprising 13,938 words, as counted using the Microsoft Word software that was used to prepare this paper, excluding the parts exempted by 37 C.F.R. § 42.24(a).

2. This Petition complies with the general format requirements of 37 C.F.R. § 42.6(a) and has been prepared using Microsoft® Word in 14-point Times New Roman.

Date: July 30, 2025

By: */Kimberly K. Dodd/*

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that on July 30, 2025, true and correct copies of the foregoing document and supporting materials were served in its entirety on the Patent Owner at the following address of record listed on the USPTO's Patent Center via FedEx Overnight:

26629 - ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (ZPS)
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Courtesy copies of the same documents were served electronically on Patent Owner's litigation counsel by email at the following address:

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